CA1 FS
-12P16

Gov.Doc.
Can
M

Canada. Marine and Fisheries, Dept.of

Papers relating to the application of the Sanitary District of Chicago for permission to divert 10,000 cubic feet of water per second from Lake Michigan. 1912.

Gov.Doc.
Can
M

Canada. Marine and Fisheries,
" . Dept. of

Department of Marine and Fisheries
Canada

Honourable J. D. Hazen, Minister

Papers Relating

TO THE APPLICATION OF THE

Sanitary District of Chicago

FOR PERMISSION TO DIVERT

10,000 CUBIC FEET OF WATER PER SECOND

From Lake Michigan

LIBRARY
MAY 13 1912
UNIVERSITY OF TORONTO.

OTTAWA
PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S
MOST EXCELLENT MAJESTY
1912

CAI FS
-12 P16

Department of Marine and Fisheries
Canada

Honourable J. D. Hazen, Minister

Papers Relating

TO THE APPLICATION OF THE

Sanitary District of Chicago

FOR PERMISSION TO DIVERT

10,000 CUBIC FEET OF WATER PER SECOND

From Lake Michigan

[Inserted at back of volume: Re Papers relating to the diversion of water from Lake Michigan ...]

OTTAWA
PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S
MOST EXCELLENT MAJESTY
1912

Digitized by the Internet Archive
in 2022 with funding from
University of Toronto

https://archive.org/details/papersrelatingto00cana_0

Ottawa, April 20, 1912

To The Honourable J. D. Hazen
Minister of Marine and Fisheries
Ottawa

Sir,—The undersigned, having been authorized by an Order in Council of the Honourable the Privy Council as representatives of the Government of Canada to oppose an application on the part of the Sanitary District of Chicago to the Secretary of War of the United States for a permit to divert not more than 10,000 cubic feet per second of water of lake Michigan through the canal of the Sanitary District of Chicago, at the Hearing before the United States Secretary of War on the 27th day of March last, have the honour to submit the following report:

That, in accordance with instructions received from you, a brief on behalf of the Government of Canada was prepared, signed by the Government representatives, and filed with the Secretary of War on the 27th of March, a copy of which is hereto attached.

In the preparation of the brief, the representatives of Canada were assisted, in conference, by the following gentlemen: Francis King, Esq., of Kingston, Ont., secretary and counsel of the Dominion Marine Association; F. E. Meredith, K.C., Montreal, counsel for the Federation of Shipping; G. T. Blackstock, K.C., Toronto, counsel for the Toronto Power Co.; Prof. T. A. Starkey, M.D. of McGill University; R. S. Lee, C.E., Montreal, Hydrau-

21559—A½

lic and Consulting Engineer; and Arthur Surveyer, C.E., Montreal.

That the representatives of the Government proceeded to Washington on the 25th of March, arriving there on the afternoon of the 26th, and in the evening of that day, a conference was held in the New Willard Hotel, at which were present the representatives of the Government and the following: Mr. James White, Secretary, and Mr. A. V. White, Engineer, representing the Canadian Commission of Conservation; Mr. Francis King, Secretary and Counsel representing the Dominion Marine Association; Mr. Andrew Allan, President, Mr. Thos. Robb, Secretary, and Mr. F. E. Meredith, K.C., Counsel representing the Shipping Federation of Canada, the latter also representing the Canadian Pacific Atlantic Steamship lines and the Canadian Northern Atlantic Shipping line; Mr. R. W. Reford, President of the Montreal Board of Trade, and Mr. L. Henderson, Chairman of the Harbour and Navigation Committee, representing that body; Mr. F. S. Spence, Acting Chairman, and Mr. E. L. Cousins, Chief Engineer, representing the Toronto Harbour Commission; Mr. David Seath, Secretary, representing the Montreal Harbour Commission; Mr. J. V. O'Donahoe, Assistant General Manager, representing the Richelieu and Ontario Navigation Company; Mr. G. T. Blackstock, K.C., Counsel, and Mr. D. H. MacDougall, Secretary, representing the Toronto Power Company.

At this conference it was arranged that Mr. Daniel Mullin, K.C., Counsel for the Government of Canada, should open the case, to be followed by other gentlemen in the order announced by Mr. Mullin at the opening of the Hearing before the Secretary of War. Accordingly, at the Hearing next day, at 10.30 a.m., before the Secretary of War, Mr. Mullin opened the case in an address on behalf of the Government of Canada, at the conclusion of which he filed the Government brief. He was followed by Mr. James White, Secretary of the Conservation Commission of Canada, who read and filed a memorial on behalf of that body. Mr. White was followed by Mr. Francis King, Counsel for the Marine Association of Canada, who made an oral argument and also filed a brief on behalf of the Association represented by him, also certain statements marked "A," "B" and "C," and Resolutions passed by the Kingston Board of Trade, Kingston, Ont. Mr. F. S. Spence, Acting Chairman of the Toronto Harbour Commission, then addressed the Secretary of War briefly and was followed by Mr. David Seath, Secretary of the Montreal Harbour Commission, who read and filed a letter, dated Montreal, March 25, 1912, addressed to the Secretary of War, signed by G. W. Stephens, President, and David Seath, Secretary, on behalf of the Harbour Commissioners of Montreal.

Mr. R. W. Reford, President of the Montreal Board of Trade then presented and filed, on behalf of that body, a memorial, signed by himself as President and by Mr. L. Henderson, as Chairman of the Harbour and Navigation Committee, dated Montreal, 25th of March, 1912. Following Mr. Reford, Mr. F. E. Meredith, K.C., made a brief address on behalf of the Shipping Federation of Canada stating that he represented the Allan Line, the White Star-Dominion Line, the Thomson Line, the Cunard Line, the Donaldson Line, the Manchester Line, the South African Line, the New Zealand Shipping Company, the Head Line, the Canadian Line, the Hamburg-American Line, and two large coasting companies, the Dominion Coal Company and the Nova Scotia Steel Company. In addition, he also stated that he represented the Atlantic Steamship service of the Canadian Pacific Railway and the Atlantic Steamship service of the Canadian Northern Railway. At the conclusion of his address Mr. Meredith filed a brief on behalf of the Shipping Federation of Canada, also a letter, dated Montreal, March 25, 1912, signed by the Dominion Coal Company.

Mr. Andrew Allan, President of the Shipping Federation of Canada, followed Mr. Meredith in a brief address. Then, Mr. John Kennedy, Consulting Engineer, spoke briefly and, finally, Mr. Geo. T. Blackstock, K.C., of Toronto, was heard in a brief address.

The Secretary of War then announced that the Hearing was closed, after which, Mr. John C. Williams, Counsel for the Sanitary District of Chicago asked permission to file a brief and was allowed one week by the Secretary of War in which to do so. The Secretary of War then allowed Mr. Mullin ten days after that to file a reply to Mr. Williams' brief.

A communication from the Richelieu and Ontario Navigation Company, dated, Montreal March 24, 1912, addressed to the Hon. H. L. Stimson, Secretary of War, and signed by C. J. Smith, General Manager, was filed with the Secretary of War, as was also a letter from Hon. Geo. R. Malby, Member of Congress.

Attached hereto is a stenographic report of the Hearing, taken by a reporter, who was engaged by the representatives of the Canadian Government, together with copies of all the briefs, statements and letters filed with the Secretary of War on March 27th, and subsequently, and including Mr. Williams' answer.

Having received a copy of the answer from the Counsel for the Chicago Sanitary District, the representatives of the Government of Canada held consultations at Ottawa to consider the reply, at which were present, besides the representatives of the Government, the following gentlemen: Mr. James White, Secretary, and Mr. A. V. White, Engineer, representing the Conservation Commission of Canada; Mr. Francis King, Secretary and Counsel of the Dominion Marine Association; Mr. F. E. Meredith, K.C., Counsel for the Shipping Federation of Canada; Mr. G. T. Blackstock, K.C., Counsel for the Toronto Power Company; and Prof. T. A. Starkey, M.D., of McGill University. Valuable assistance was rendered to the representatives of the Government by these gentlemen, particularly by Prof. Starkey, Mr. James White, Secretary of the Conservation Commission, and Mr. Francis King, Counsel for the Dominion Marine Association.

The reply having been completed on the 15th of April, it was duly signed by the representatives of the Government.

Mr. W. J. Stewart, proceeded to Washington with the reply and filed same with the Secretary of War on the 16th day of April, 1912, being within the time allowed by the Secretary of War for the filing of the reply.

Hereto attached is a copy of the reply as filed with the Secretary of War, the conclusions of which are as follows:

(1) That there is no imperative necessity for such a large diversion of water from lake Michigan for sanitary purposes as is requested in the application.

(2) That the historical facts presented in this brief show conclusively, that the Sanitary canal can not be considered as the outgrowth and development of a scheme which has received recognition by the United States Government or that of the Dominion of Canada.

(3) That the claim that the Sanitary District is entitled, as a matter of right, to the use of so much of the waters of lake Michigan as may be necessary for sanitary and domestic purposes, cannot be entertained in so far as it relates to the extraordinary and wasteful use proposed.

(4) It has been shown that very substantial injuries have been made and are being suffered by navigation interests. Fears for future and more extensive damages by reason of increased diversion are exceedingly well founded and justify the demand that some improved method of sewage disposal which shall not require the abstraction of any considerable quantity of water from lake Michigan nor the diversion to other outlets of waters which would naturally flow into it, be adopted.

(5) That the Dominion of Canada has the right to a voice in the disposition of the waters of lake Michigan for sanitary purposes, in so far as such diversion injuriously affects navigation because her citizens are accorded, by treaty, the right of free navigation in that lake, and in that no diversion can be made without injuriously affecting her harbours, channels and canals.

(6) It having been shown that the sewage of Chicago can be so treated and disposed of by other means than the present dilution methods, by which great quantities of water are withdrawn from lake Michigan and discharged through the Drainage canal into the Illinois river, it is contended on behalf of Canada, that the abstraction of water from lake Michigan shall be limited to such quantity as shall not injuriously affect navigation interests on the Canadian side of the boundary, and that such limitation shall take effect at the end of such time as, in your judgment, may be reasonably necessary for the Sanitary District to instal and put into use the works which may be required for disposing of the sewage by other means than by the dilution method now in use.

(7) That, in view of the fact that the Sanitary District claims that permits hitherto issued deal only with flow through the lower portion of the Chicago river and that it has the right to take any amount of water without permission through the canal provided it is supplied through other feeders, it is respectfully requested that all permits be only for such limited quantity of water as shall not injuriously affect navigation on the Lakes and St. Lawrence

river, and be so worded as to state the total quantity which the Sanitary District of Chicago may be permitted to withdraw, for domestic and sanitary purposes, from the drainage basin of lake Michigan.

We feel confident that the interests of humanity at Chicago, and the levels of the Great Lakes and of the St. Lawrence river, can best be protected by the installation of a modern system of sewage disposal, rather than by using a method which has been shown to be injurious to the navigation and commerce of both nations, and, further, that the interests of the public generally will, thus, be protected and their welfare promoted.

All of which is respectfully submitted

Daniel Mullin
Counsel
John Kennedy
Consulting Engineer
A. St. Laurent
Assistant Deputy Minister
Public Works, Canada
Wm. J. Stewart
Chief Hydrographer
V. W. Forneret
Superintending Engineer
St. Lawrence Ship Channel

Representing the Government of Canada

INTRODUCTION

The Great Lakes, which constitute the most extensive, navigable, inland waterway in the world, have already had their levels permanently lowered to an extent which has resulted in serious loss to navigation and other interests. These changes in levels have occurred because waters which, under natural conditions, would have reached the sea by way of the St. Lawrence river, have, instead, been diverted through an artifically constructed channel at Chicago and, thereby, made to reach the sea by way of the Mississippi valley.

This loss in levels is a matter of national concern both in the Dominion of Canada and in the United States. As it is one of momentous importance to the citizens of both countries, an intelligent understanding should be had of the facts relating to the whole matter. The knowledge and bearing of these facts may readily be understood by the general reader from the official, and other documents of record published in this volume. A few introductory statements, however, will serve to set forth its general scope and, at the same time, induce more extended study of the questions involved.

The need for conserving the integrity of the levels of the Great Lakes has long been appreciated and, in 1909, was made the subject of treaty between Great Britain and the United States. This treaty, known as the Boundary Waters Treaty, provides that no diversion from the boundary waters between Canada and the United States shall be made without the express authority of the governments of both countries, and corresponding provision is also made in the treaty respecting the diversion of other waters which materially affect the levels or flow of boundary waters. The present diversion of water through the Mississippi valley, is one which materially affects the level and flow of boundary waters and, consequently, has become a subject for international consideration.

The diversion under discussion, had its origin in the sanitary needs of the city of Chicago. Chicago was confronted with the urgent necessity of disposing of her sewage in a manner that would prevent contamination of her water supply.

Two sluggish streams, the North branch and the South branch of the Chicago river (see accompanying map), flow through the city approximately parallel to the shore of lake Michigan, to the main Chicago river which—since the diversion—flows *westward* from lake Michigan. For many years, the sewage of the city was discharged into these streams, and, at least as early as 1860, the offensive condition of the South branch attracted official attention. The first complaints arose, not on account of contamination of the water supply, but on account of the offensive odour. In 1862, high water in the river, and lowering of the lake level by wind, resulted in arousing complaints respecting the foul smell and taste of the water supply.

In 1871, the situation was partly relieved by cutting down the summit level of the Illinois and Michigan canal — connecting the Chicago and Desplaines rivers — and drawing the water for the canal from lake Michigan. Later, it was found necessary to install pumping machinery, at Bridgeport, to maintain a current westward through the South branch and the Illinois and Michigan canal. In 1874-80, another pumping plant was constructed to pump water from the lake, through the Fullerton Avenue conduit, into the upper waters of the North branch.

In 1880, after twenty-five years of struggling to get rid of her sewage and prevent contamination of her water supply, Chicago was still looking for some means of purifying the river from its filth, and preventing a repetition of the great epidemics of 1848, and 1854, which had led to the construction of the first system of sewers.

To meet these conditions, Chicago, in 1889, decided to adopt an extensive sewage scheme employing what is known as the dilution method. This method was selected because it was believed that, if sufficient water could be readily and cheaply obtained, this method would be an economical one *for Chicago.* The dilution method consists essentially of diluting sewage effluent with sufficient water to render it inoffensive. In the case of the Sanitary District of Chicago, this proportion has been established by a State law which fixes it at one cubic foot of water per second for each 300 of population. On this basis, a population of 3,000,000 would require 10,000 cubic feet per second —an enormous amount of water and *comparable to the* *mean quantity passing over the American fall at Niagara.* Lake Michigan—an integral part of the Great Lakes system—and practically a unit with lake Huron and Georgian bay—afforded a possible source of supply and was tapped by Chicago.

A corporation, known as the Sanitary District of Chicago, was formed under a special Act of the State of Illinois, and empowered to undertake the construction and operation of the works necessary for the new projects. The enabling Act, entitled "An Act to create sanitary districts and to remove obstructions in the Desplaines and Illinois rivers," was passed May 29, 1889, and came in force July 1st of the same year. The Sanitary District comprises an area of 358 square miles and is shown upon the plan published herewith.

One of the first works to be constructed was a large artificial channel, known as the Chicago Drainage canal extending from Robey St. in Chicago, to Lockport, Ill., a distance of 32 miles. By means of this channel, water from lake Michigan flows *westward* through the Chicago river—whose flow has been reversed—to the canal, and is discharged into the Desplaines river at Lockport. The canal was designed to carry 10,000 cubic feet of water per second, but was constructed to carry 14,000 c.f.s.

The canal was opened on January 17, 1900. Water from lake Michigan then flowed through Chicago by way of the Sanitary canal into the Mississippi. As a high-water cycle in the Great Lakes followed the diversion, the injurious effects were not, at first, apparent. In 1909, a low-water cycle commenced and, in 1911, the level was only a few inches above the level of 1895—which, with the exception of 1819, is the lowest water ever recorded. The knowledge that a part of the loss then experienced, was due to the diversion at Chicago, effectually aroused navigation and the allied interests who were thus injuriously affected by the selfishness of Chicago.

The United States Secretary of War is vested with jurisdiction over, and discretionary powers appertaining to, the navigable waters of the United States. As the new flowage of water through the Chicago river affected navigation at the port of Chicago, it became necessary for the Sanitary District to apply to him for permission to divert the waters it proposed to use. The Secretary authorized the diversion of a certain quantity of water and, after subsequent modifications, a permit was issued, fixing the amount authorized for diversion at 4,167 cubic feet per second. (Copies of permits issued will be found below as Appendix D). The Sanitary District, however, did not confine its use of water to the quantity authorized by the Secretary of War. A Special Board of Engineers, under the Chairmanship of Brig. Gen. W. H. Bixby, Chief of Engineers, was appointed to report upon the effect upon navigation of diversion at Chicago. The Special Board reported that the Sanitary District was diverting some 7,000 cubic feet of water per second, thus *exceeding the authorized amount by 3,000 c.f.s.*

It was proposed, in connection with the Chicago Drainage canal, to construct a navigable waterway from Chicago, by way of the Mississippi valley, to the gulf of Mexico. General Bixby has reported that 1,000 cubic feet of water per second would be ample for purposes of navigation.

A large amount of power can be developed from waters diverted by the Drainage canal, and along the course of the proposed navigation route. The development, and sale, of this power would create a large revenue, and, in connection with this project, the Sanitary District and other interested parties, have entertained the hope, and expressed the expectation, that profits derived from the sale of hydro-electric energy, developed by means of waters diverted through the canal, would meet the whole expenditure on the Lakes-to-the-Gulf Deep Waterway.

It will be recognized, therefore, that this development of cheap power, coupled with the method of sewage disposal, has been a very strong incentive for Chicago interests to obtain all the water possible.

On the 5th February, 1912, the Sanitary District requested permission from the Secretary of War "to withdraw from lake Michigan through the Chicago and Calumet rivers—not to exceed 10,000 cubic feet of water per second". The Government of Canada was notified that the Hon. Henry L. Stimson, U.S. Secretary of War, would hold a hearing at which those interested might make statements relating to the effect which the proposed increased diversion of water at Chicago would have upon their respective interests. In accordance with this notification, the Hon. J. D. Hazen, Minister of Marine and Fisheries, Canada, appointed a special Committee to prepare a case on behalf of the Dominion of Canada. This Committee, consisting of Messrs. Daniel Mullin, K.C., A. St. Laurent, W. J. Stewart, V. W. Forneret and John Kennedy, was appointed by Order in Council dated March 27, 1912 (see Appendix B). The report and recommendations of this special Committee are embodied in the brief and counter-brief which have been submitted to the U.S. Secretary of War on behalf of Canada.

At the first Hearing, held at Washington on February 28, 1912, representations for, and against, the application, were made by citizens of the United States. A second Hearing was held, also at Washington, before the Secretary of War, on March 27, 1912, when protests were made on behalf of the Government of Canada, the Commission of Conservation, the Dominion Marine Association, the Montreal Board of Trade, the Montreal Harbour Commission, the Toronto Harbour Commission and others.

Mr. Daniel Mullin, K.C., who presented the Argument on behalf of the Dominion Government, in the course of his remarks, showed the character and extent of the damage that had, already, resulted to lake levels by the diversions now made at Chicago; and also, the extent of the still greater damage that would result if the increased diversions which had been requested, were authorized. Counsel for Canada further submitted, that these diversions materially affected the levels and flow of boundary waters and were, therefore, in direct violation of the Boundary Waters Treaty, of 1909.

A request was made on behalf of the Government of Canada that the application of the Sanitary District of

Chicago to increase its diversion from lake Michigan be not granted and, that any abstraction of water from lake Michigan be limited to such quantity as shall not injuriously affect navigation and other interests on the Canadian side of the boundary.

After the Hearing of March 27, 1912, the Secretary of War announced that seven days would be allowed the Trustees of the Sanitary District to file their Brief—the Dominion of Canada to file its Counter-brief, not later than April 16th.

The Argument for Canada, together with the Brief for Canada, and the Brief of Mr. J. C. Williams, Counsel on behalf of the Trustees of the Sanitary District of Chicago, and also the Counter-brief for Canada, all as submitted at the respective Hearings, are given below in full. The memoranda and statements made by various organizations represented at the hearings, including that of the Commission of Conservation of Canada, are also published herewith.

As a result of carefully weighing all the testimony of the navigation and other interests which have been adversely affected by the lowering of the levels of the Great Lakes, and the testimony adduced before the Secretary of War, and, also, the other available data bearing on the subject, the special Committee appointed by the Government of Canada unanimously reached the conclusions found at pages 215 to 217, below, and with which conclusions, the Counter-brief for Canada closes.

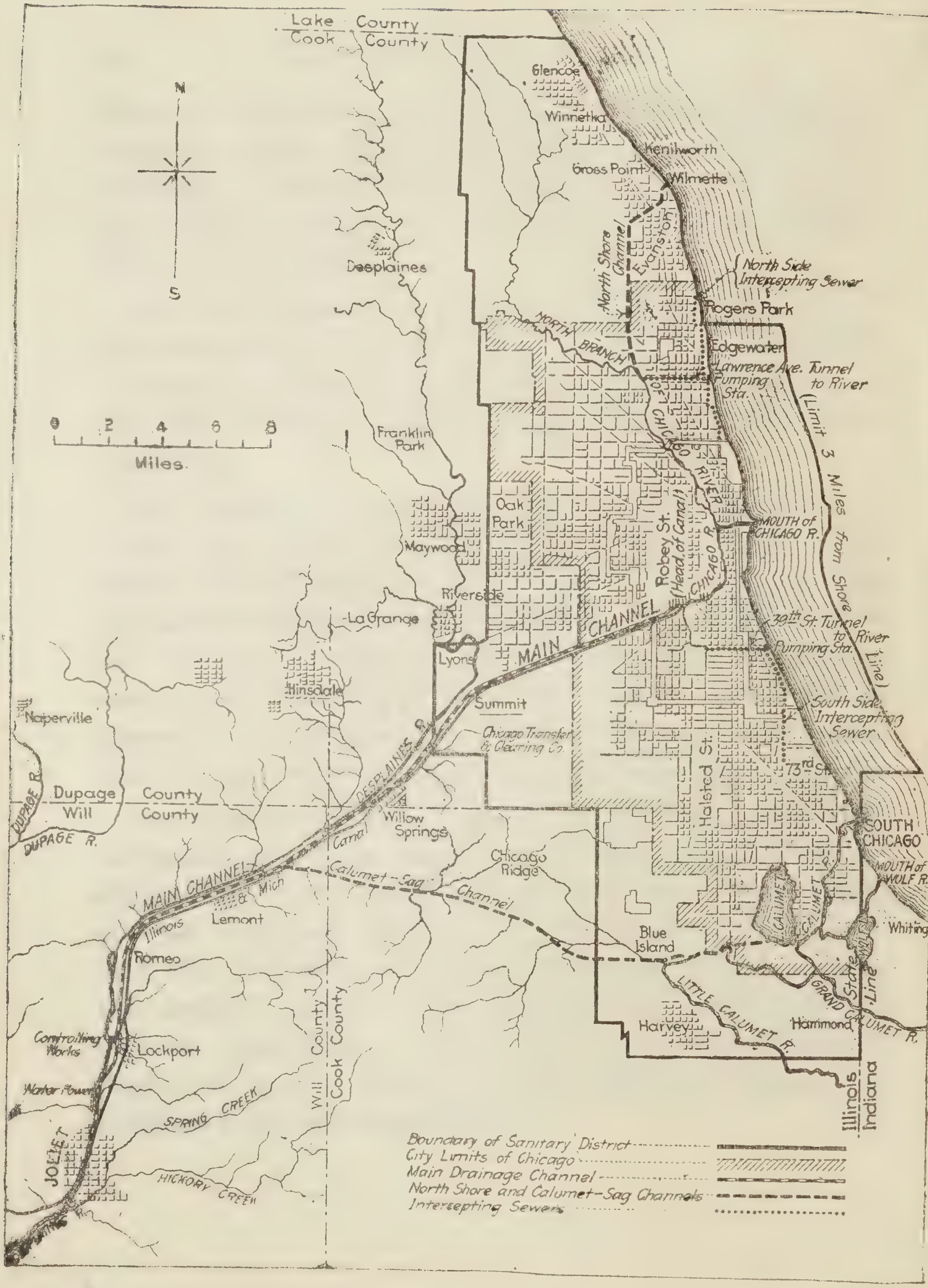

Lake County
Cook County
N
S
Glencoe
Winnetka
Kenilworth
Gross Point
Wilmette
North Shore Channel
Evanston
North Side Intercepting Sewer
Desplaines
Rogers Park
Edgewater
North Branch
Lawrence Ave. Tunnel to River
Pumping Sta.
(Limit 3 Miles from Shore Line)
0 2 4 6 8
Miles.
Franklin Park
Oak Park
Robey St. (Head of Canal)
Chicago River
Mouth of Chicago R.
Maywood
Riverside
La Grange
Main Channel
39th St. Tunnel to River
Pumping Sta.
Lyons
Hinsdale
Summit
Naperville
South Side Intercepting Sewer
Chicago Transfer & Clearing Co.
Desplaines R.
Halsted St.
73rd St.
Dupage County
Will County
Dupage R.
Willow Springs
Canal
South Chicago
Mouth of Wolf R.
Chicago Ridge
Main Channel
Calumet-Sag Channel
Illinois & Mich
Lemont
Calumet L.
Calumet R.
Whiting
Blue Island
Romeo
Little Calumet R.
State Line
Grand Calumet R.
Harvey
Hammond
Controlling Works
Lockport
Will County
Cook County
Water Power
Spring Creek
Illinois
Indiana
Joliet
Hickory Creek
Boundary of Sanitary District
City Limits of Chicago
Main Drainage Channel
North Shore and Calumet-Sag Channels
Intercepting Sewers

TABLE OF CONTENTS

PAGE
Report of Government Representatives III
Introduction XI

Arguments and Statements:

Daniel Mullin, K.C., Argument 6
" " Brief 36
Francis King 83
F. S. Spence 105
David Seath 108
R. W. Reford 110
F. E. Meredith, K.C. 114
Andrew Allan 118
John Kennedy 125
George T. Blackstock, K.C 126

Memorials, Letters, &c., Presented:

Commission of Conservation 73
Dominion Marine Association 95
Kingston Board of Trade 103
Harbour Commissioners of Montreal 108
Montreal Board of Trade 110
Shipping Federation of Canada 120
Dominion Coal Company 124
Richelieu and Ontario Navigation Company 130
Hon. George R. Malby, M.C 133
Reply of Sanitary District 137
Reply on Behalf of Canada 186

Appendices:

A—Notice of Hearing 218
B—Order in Council 220
C—Application for Diversion, Feb. 5, 1912 221
D—Permits for Diversions 223
E—Boundary Waters Treaty, 1909 230
F—Canadian Legislation *re* Boundary Waters Treaty 240
G—United States Legislation *re* Boundary Waters Treaty 242
H—Statement *re* lowering Lake Erie 244
I—Effect of Diversion (Bixby) 246
J—Illinois to Mississippi Waterway 249
K—Permit for Diversion, June, 30, 1910 261
L—Report of Edward Bath and Edward Surveyer 263

In the Matter of the Application of the Sanitary District of Chicago for the Diversion of more Water from Lake Michigan

Hearing before the Secretary of War, Hon. Henry L. Stimson, in the matter of the application of the Board of Trustees of the Sanitary District of Chicago for enlargement of the term of the instrument executed by the Secretary of War, May 8, 1899, as modified by subsequent instruments, touching the flow of water from Lake Michigan through the Canal of the Sanitary District of Chicago, so as to permit the withdrawal from Lake Michigan, through the Chicago and Calumet Rivers of water not to exceed 10,000 cubic feet per second.

War Department, Washington, D.C.
Wednesday, March 27, 1912
10:30 o'clock A.M.

The meeting was called to order by the Hon. Secretary of War.

Present: Representing the Government of the Dominion of Canada:

Mr. D. Mullin, K.C., Counsel.

Mr. A. St. Laurent, Assist. Deputy Minister, Dept. Public Works, Canada.

Mr. W. J. Stewart, Chief Hydrographer, Dept. of Naval Service.

Mr. V. W. Forneret, Supt. Engineer, River St. Lawrence Ship Channel.

Mr. John Kennedy, Consulting Engineer.

Present: Representing the Canadian Commission of Conservation:

Mr. James White, Secretary.

Mr. A. V. White, Engineer.

Present: Representing Montreal Harbour Commission:

Mr. David Seath, Secretary.

Present: Representing the Toronto Harbour Commission:

Mr. F. S. Spence, Acting Chairman.

Mr. E. L. Cousins, Chief Engineer.

Present: Representing the Montreal Board of Trade:

Mr. R. W. Reford, President.

Mr. L. Henderson, Chairman of Harbour and Navigation Committee.

Present: Representing the Shipping Federation of Canada:

Mr. Andrew Allan, President.

Mr. Thomas Robb, Secretary.

Mr. F. E. Meredith, K.C., Counsel, also representing Canadian Pacific Atlantic SS. lines and Canadian Northern Atlantic Shipping Line.

Present: Representing the Richelieu and Ontario Navigation Company:

Mr. J. V. O'Donahoe, Assistant General Manager.

Present: Representing the Dominion Marine Association:

Mr. Francis King, Counsel.

Present: Representing Toronto Power Company.

Mr. G. T. Blackstock, K.C., Counsel.

Mr. D. H. MacDougall, Secretary.

and present:

Mr. Edwin Bath, Civil Engineer.

General Bixby, Chief of Engineers, United States Army, and others interested.

SECRETARY STIMSON: Gentlemen, today's hearing has been arranged in order that I may hear from the representatives of the Canadian Government and the Canadian interests. I have a memorandum here which indicates that Mr. Mullin, Mr. St. Laurent, Mr. Stewart, Mr. Forneret, Mr. Kennedy and others are here. I can give you two hours this morning for this hearing, if that much time is necessary. I will have to ask the gentlemen who represent the Canadian Government and the Canadian interests to arrange between themselves as to the division of the time.

MR. MULLIN: I have here a memorandum of who are present here and whom they represent, as follows:

(MR. MULLIN read the memorandum giving the information as stated in the appearances heretofore noted:)

SECRETARY STIMSON: Now, Mr. Mullin, inasmuch as our time is necessarily somewhat limited, will you gentlemen please arrange between yourselves as to how you will divide the time, and I will conform to such arrangements as you agree upon between yourselves. I can sit here for two hours, if that much time is desired.

MR. MULLIN: I thank you very much, Mr. Secretary, for your kindness in conceding us so much time.

SECRETARY STIMSON: That much is conceded to the Canadian interests.

Mr. Mullin: I may say, Mr. Secretary, that we had a conference last night in regard to the question as to the allotment of time between the different interests appearing here. Of course, as representing the Government, as counsel for the Canadian Government, it was suggested that I should open the matter, and then Mr. James White, Secretary of the Conservation Commission of Canada, should follow, then Mr. Francis King, Secretary and counsel of the Dominion Marine Association; following Mr. King, Mr. F. S. Spence, of the Toronto Harbour Commission; Mr. David Seath, Secretary of the Harbour Commission of Montreal, Mr. Robert W. Reford, President of the Montreal Board of Trade; Mr. F. E. Meredith, K.C., counsel representing the Federation of Shipping and also authorized to speak for the Canadian Pacific Railway and the Canadian Northern Railway; Mr. Andrew Allan, Chairman of the Shipping Federation, and finally, Mr. John Kennedy, Consulting Engineer.

Secretary Stimson: That makes nine altogether.

Mr. Mullin: Yes sir. Well, of course, some of the gentlemen will probably not occupy much of the time.

Secretary Stimson: I will leave the distribution of the time to you, my only idea being that you shall close within two hours..

ARGUMENT OF MR. D. MULLIN, K.C.

In behalf of the Canadian Government

MR. MULLIN: I appreciate the courtesy you have extended to us, and I will now proceed to open the case in behalf of the Canadian Government.

I may say at the outset, Mr. Secretary, that I understand the question which you are called on to pass upon is as to whether or not, the diversion asked for by the application on behalf of the Chicago Sanitary Board will substantially affect navigation interests. Subsidiary to that, there is another question which I understand was discussed somewhat at the last hearing, and, that is to say, as to whether or not there are other modern methods by which sewage can be taken care of, besides the dilution method. But I understood, or rather I gathered, from the record that you did not feel called upon on that occasion to permit a discussion at any length of that question.

SECRETARY STIMSON: I understand my jurisdiction is limited to finding out whether or not this would mean a substantial injury to navigation.

MR. MULLIN: Yes, sir; then I may say, having in view what I read in the record on that branch of the case—(I would not have referred to that except from the fact that we felt, in view of the fact that counsel representing the Chicago Sanitary Board did address himself to that question in his reply, at considerable length, and also the fact that the application itself puts forward this method of dilution as the only practical modern method of taking care of sewage in a case like that of Chicago)—that we ought, perhaps, to advert to that branch of the subject.

Secretary Stimson: I do not intend to put any constraint upon anything anyone wants to say. I only make that suggestion for your own benefit. If you want to discuss any other feature of the case, you can do so. I only make this suggestion in the interest of possibly saving your time.

Mr. Mullin: I have in mind what you have in mind as to your jurisdiction in the matter, and acting for the Canadian Government I propose to address myself chiefly if not altogether, to the question of the effect upon the Canadian navigation interests.

I may say, however, that Mr. John Kennedy, Consulting Engineer, has given attention to the other branch of the case, and as it bears very materially, I think, upon this application, I would ask that he be permitted to take up that branch of the case.

Mr. Secretary, in dealing with this question, so far as it affects Canada, there is, to my mind, a question of international relationship involved. There is a question of treaty rights involved, and a question of comity.

So far as the questions of international relations and comity are concerned, I will not dwell upon that feature of the case; but so far as treaty rights are concerned, I may be permitted to say that the recent treaty, the International Boundary Waters treaty, does, it seem to me, bear particularly on this case.

I have in mind the preliminary article defining boundary waters, which, perhaps, on a strict construction, would not include Lake Michigan; but it must be recognized that Lake Michigan is what might be termed a tributary water, a channel which flows into boundary waters. In addition to that, Mr. Secretary, the second clause of Article I extends the right of navigation, so long as the treaty continues, to both countries, just the same as the first clause extends the right of navigation on boundary waters. That being so, Mr. Secretary, you will recognize that Canada has a direct interest.

Secretary Stimson: What section is that?

Mr. Mullin: That is Article I. I refer to the second clause of Article I. Under that I submit that Canada has a direct interest in the question of the navigation of Lake Michigan, and is entitled to come here, through your kindness and courtesy, Mr. Secretary, to present objections to any diversion of water from Lake Michigan, because, by the treaty right conceded to her, Canada has a right to the same navigation that the United States has of Lake Michigan. The right of navigation necessarily implies the right to make any harbours, including Chicago.

It has appeared here, Mr. Secretary, in the argument which was presented on the former occasion, that very serious injury was occasioned to shipping interests, by reason of the diversion through the Chicago River, and, as I gathered from the argument it was very strongly impressed upon you at that time that the diversion through the Chicago River had occasioned such a current there that it was very dangerous to life and property. That is the way Mr. Arthur Sullivan expressed it on that occasion, as I gather from the record, and several other gentlemen, including Mr. Ford, expressed the view that it was very detrimental to navigation of the Chicago River.

As I understand it, Mr. Secretary, it is necessary, in order to make the Chicago harbour, that vessels should enter through the mouth of this river, and, consequently, they have to meet this serious impediment to navigation.

That is a matter in which, I submit, Canada has an interest under the treaty. Canada has a very considerable number of vessels plying between Chicago and Canadian ports, chiefly laden with grain, outward from Chicago, and these vessels have to make the harbour of Chicago and encounter these difficulties in common with vessels of the United States.

So that I submit that upon that branch of the case Canada has a direct interest, and any injury which has been occasioned by the diversion of Lake Michigan waters into the Chicago River has caused detriment and damage to Canadian interests.

I wish to point that out, and I submit that that is a fair contention under the rights of navigation which I have referred to as being guaranteed under the second clause of Article I of the Treaty.

I might say, however, that the chief ground upon which Canada presses her claim that navigation interests are seriously affected is by reason of the lowering of the lake levels and the lowering of the levels on communicating channels, which, under the treaty, are free and open to the navigation of both countries. Also, the serious lowering of the St. Lawrence River, not only on a very difficult portion of it, so far as navigation is concerned,—the rapids and the canals, at that particular part of the river, the Canadian canals, but also the ship channel below Montreal. A gentleman who is here, representing the Canadian Federation of Shipping, will speak more particularly on that branch of the subject.

Mr. Andrew Allan, who is here representing the Allan line, will be able to point out very particularly about the serious injury which has already been occasioned in the last few years by reason of the lowering by several inches of the waters of the St. Lawrence below Montreal, and before reaching tide-waters, which, I believe, are reached at about Lake St. Peter on the St. Lawrence, about half-way between Montreal and Quebec.

I submit, Mr. Secretary, that, as you are aware, under the treaty of Washington the United States has the same right to navigation in the St. Lawrence River from the point where the St. Lawrence ceases to be a boundary water as Canada has. Therefore, I am in a position to say that both countries are directly interested in maintaining the integrity of the navigation of the Great Lakes waterway system, including the St. Lawrence, to the sea.

I also understand that there was an act passed by the Illinois legislature in April, 1872, in response, it is said, to the Washington treaty of the preceding year, giving the right to Canada to navigate the Illinois and Michigan Canal and any canals that might be constructed in the State of Illinois by the State. Whether that has any direct bearing upon the case, it at all events shows that Canada has been recognized as having rights even so far back as 1872, in Lake Michigan. I think, in fact, from 1854, down. The treaty of 1854, I think, first recognized that Canada would have a right to navigate in Lake Michigan, and I think also the United States was given similar rights in the St. Lawrence, that is where it ceases to be a boundary water between the United States and Canada. Whether I am absolutely correct about that or not, there is no question about that today. Under existing treaties, Canada has a right and the United States has a right, in all these waters, to navigate them while these treaties exist. In fact, I think, under the treaty of Washington by express provision in the treaty it is declared that the right of navigation so far as the United States is concerned shall be perpetual, shall be forever. And that treaty of course will continue.

So far as the right of Canada to navigate Lake Michigan is concerned, the treaty limits it to the period during the existence of the treaty. That treaty is in force, and, while it is in force, I submit that Canada has a perfect right to navigate Lake Michigan in any way that she may, so far as the navigable waters of Lake Michigan are concerned.

It has been said, and it has been strongly urged upon you, Mr. Secretary, that the International Waterways Commission had recommended that this quantity of water be allowed for the Chicago Drainage Canal. It is true that there was some recommendation. It seems an extraordinary thing that they should have made a recommendation of that kind in view of the facts adduced in the same report with regard to the serious injury that the lowering of the levels of the Lakes in consequence of the diversion of 10,000 cubic feet per second would cause—that they then made this recommendation. They said that there was a general tacit agreement—

SECRETARY STIMSON: I was going to ask you about that. That was raised last time. It was claimed on behalf of the Sanitary District that, under this report at the time when the Joint Commission representing both countries took this matter up, they virtually agreed that there should be an allowance of not more than 10,000 cubic feet per second. That claim was made, and in the report they cited the words which you have just mentioned. The fact that there was a tacit agreement and the general language of the recommendations as bearing them out was referred to.

Mr. Mullin: It was because I saw that in the record and I felt called upon to make a reference to it. I wish to draw attention to it in this way. While it is true that there is the recommendation referred to, as you will see on examination of the report of the Commission, it was a matter that their attention was directed to more particularly with regard to the injury that was going to be occasioned by reason of the proposed diversion of 14,000 cubic feet per second, and incidentally they mentioned that there was this general tacit agreement, an acquiescence, as it were, in the withdrawal of 10,000 cubic feet per second, which was the amount for which the canal was originally designed.

I wish to say in regard to that, that while the gentlemen representing Canada—I speak so far as they are concerned only—on that Commission are very estimable gentlemen, they were not authorized to bind the Government of Canada; they were simply acting in an advisory capacity. They made their recommendation, such as it is—which is not a positive recommendation, it is only a permissive recommendation—so far as the 10,000 cubic feet per second is concerned, and I submit that a fair reading of that is, that they were constrained by reason of the greater amount that was being asked for and urged upon them to agree to the lesser amount, in the way they did, but not in a positive way.

Secretary Stimson: May I ask you just what you mean when you say they were not authorized? Supposing that they had said directly, "We find that a diversion of not more than 10,000 feet will not hurt navigation;" would they have authority to say that?

Mr. Mullin: I do not think they would have, in view of their findings as to the facts.

SECRETARY STIMSON: As a question of construction. I was assuming that they would say that, for the purpose of argument, and not admitting at all that they did say it—do you dispute their jurisdiction to have found that fact?

MR. MULLIN: Well, I should dispute this: that they would be able to bind Canada or that the United States Commission would be able to bind the United States. As I understand it, their powers were limited to advising and recommending a certain course. It was a matter, then, for both countries to determine, whether or not they would come to an agreement on that subject.

Upon that branch of it, you will note, Mr. Secretary, that the treaty itself, although this recommendation was made regarding the Chicago Canal, and in the same report or in another report on Niagara Falls, in which this question of the Chicago Drainage Canal was referred to, and the recommendation in that report made in the same way—when the parties concerned, both countries, got together, the representatives of the countries got together and came to a conclusion and entered into a binding agreement by the way of treaty, while there is a mention in that treaty of the amount that is to be diverted from the Niagara River at Niagara Falls, both as regards Canada and the United States, there is no mention in that treaty with regard to the Chicago Drainage Canal.

I submit, therefore, that the fair inference is that neither country agreed to the recommendation of the International Waterways Commission upon that point. At all events, I contend in behalf of Canada—and I may say here that I appear with full instructions to object on behalf of Canada, not on this particular point, I do not say that I have any special instructions on this particular point, but generally, against this diversion of water—I say that speaking as counsel for Canada, I submit that it is a fair argument, that in the absence of any reference to the Chicago Drainage Canal in that treaty, then the conclusion must be that the parties to the treaty did not agree to it, that the countries represented in that treaty did not agree that that diversion should be made for the Chicago Drainage Canal as recommended by the Internationl Waterways Commission.

SECRETARY STIMSON: There was an argument last time, as I recall it, to the effect that the very fact that the amount allowed to Canada was larger than the amount allowed to the United States at Niagara involved a recognition of the fact that the United States was already getting an amount equivalent to the difference, considering the amount diverted at Chicago.

MR. MULLIN: Yes sir; I understand that that argument was pressed upon you, Mr. Secretary, and, on the face of it, it seems to be very plausible. Of course we have not the record of what took place at the time the treaty was negotiated, but we have this fact: that, so far as the diversion at Niagara Falls is concerned, while it is true, that the diversion to the Canadian side of 36,000 cubic feet per second, is much greater than that to the United States, which was 20,000 cubic feet per second, it will be noted that it is more apparent than real so far as any advantage to Canada is concerned, because by the Burton Act, as I understand it, the United States have a right to import into the United States one-half of the electric power generated in Canada. Canada agrees to one-half indefinitely, I understand it, and agrees to two-thirds until such time as Canada needs it, which will probably be a very remote period. At all events, the United States is entitled to have imported into the United States, one-half of the power generated in Canada.

And what do we find? That United States investments are being made in Canada and United States interests are represented very largely so far as investments are concerned in the development of power on the Canadian side of the line. So, as I say, the advantage so far as Canada is concerned, is more apparent than real in regard to that; and I submit that that is a fair answer, when it is urged on the other side that the Chicago Drainage Canal must be taken into consideration. If the Chicago Drainage Canal were taken into consideration, I would submit that the United States would have infinitely the best of the bargain. I would submit that there is another very serious element in that connection which ought to have an important bearing on that point, and it is this: that while the water diverted at Niagara Falls on both sides returns again and is used for navigation, and navigation is not affected by reason of that diversion in any way, because the levels in the navigable parts of Lake Ontario and the St. Lawrence are not lowered at all in consequence of that—

SECRETARY STIMSON: The only navigation affected by that diversion is the navigation over the Falls.

MR. MULLIN: Yes sir, which of course is of no advantage to anyone. But I need not elaborate that further. The diversion at Chicago is an absolute and irreparable loss to the navigation interests of both countries. It is a permanent diversion. One of the worst features about it, Mr. Secretary, is that it is an insidious effort to get water—I will not say for any other purpose than for sanitary purposes, but there is no question about it, if you will read the preliminary report, that there was another object in view, and that was the Lakes-to-the-Gulf project. Now, that raises an international question as to whether water should be diverted for that purpose, and in that connection General Bixby, in a report which he signed, and which I think is dated in February, 1911, referred to the fact again and again, in two separate places in his report, that 1,000 feet per second is all that is required for navigation purposes.

I am not going into the other branch of the sanitary question, but I would say, can it be claimed that 9,000 feet are required exclusively for sanitation purposes? Is there no other method? In that connection, it seems to me very pertinent to refer to the idea which will be presented by Mr. Kennedy on that branch of the subject. Mr. Kennedy, I may say, may not be able to read what he wants to and may ask me to do it for him, but he will speak to the subject. He has prepared a statement in regard to that which it seems to me is very important from the standpoint of navigation interests, as showing this: that so far as this method of dilution is concerned, it is not the only one and not the most modern one or the one most generally adopted now on the Continent of Europe and in England, and in this country, the United States of America. Chicago, I might say, stands alone, so far as my information goes, with respect to using this method of dilution in the very extensive way in which it is used.

I do not forget, Mr. Secretary, that in the treaty which has been negotiated, sanitary and domestic purposes are put ahead of navigation rights, so far as boundary waters are concerned. So far as Lake Michigan is concerned, I think the fair construction of the preliminary article is that it is not a boundary water, and it is a lake, as you know, which is exclusively within the territory of the United

States, and the fact that it is expressly mentioned in the second clause of Article I and referred to there the way it is, as being free in the same way that boundary waters are, draws the distinction between Lake Michigan and boundary waters.

SECRETARY STIMSON: You do not claim, as I understand you, that Lake Michigan is a boundary water.

MR. MULLIN: Not directly, in view of the treaty. I think the proper construction is that it is channel water flowing into boundary waters.

Under the second article, either country may divert waters but if there are diversions which injure the rights of persons on the other side of the boundary, they shall have the same rights, in the courts of the country where the diversion is made as if they lived in that country and their rights were affected in that country.

But there is a second clause in Article II, Mr. Secretary, which goes further and gives the other country a right to object if there is such a diversion, if such a diversion affects the boundary waters.

Now, I submit, that that opens the door to Canada here, before you, to raise the objections to the diversion of water from Lake Michigan. That seems to me to be expressly in point. Under that, we do object to the diversion of waters. The fact that we are given the right to object, necessarily implies, I would submit, that if the objection is well founded, then it ought to prevail.

That brings me to another branch of the subject, Mr. Secretary, that is to say, the third Article. Under that you will note:

"It is agreed that, in addition to the uses, obstructions, and diversions heretofore permitted or hereafter provided for by special agreement between the Parties hereto, no further or other uses or obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line, affecting the natural level or flow of boundary waters on the other side of the line, shall be made except by authority of the United States or the Dominion of Canada within their respective jurisdictions and with the approval, as hereinafter provided, of a Joint Commission, to be known as the International Joint Commission.

"The foregoing provisions are not intended to limit or interfere with the existing rights of the Government of the United States on the one side and the Government of the Dominion of Canada on the other, to undertake and carry on the Governmental works in boundary waters for the deepening of channels, the construction of breakwaters, the improvement of harbours, and other Governmental works for the benefit of commerce and navigation, provided that such works are wholly on its own side of the line and do not materially affect the level or flow of the boundary waters on the other, nor are such provisions intended to interfere with the ordinary use of such waters for domestic and sanitary purposes."

You will note that that Article deals with boundary waters, and I would submit that a fair construction of it would be that it did not apply to Lake Michigan, but that Lake Michigan might come under the construction of the second Article, wherein is given to Canada the right to object if such diversion causes material injury to boundary waters.

With regard to the third Article, I wish to refer to the concluding clause, which provides:

"nor are such provisions intended to interfere with the ordinary use of such waters for domestic and sanitary purposes."

If it be taken that the spirit of this treaty means that waters are to be diverted for sanitary purposes, say of waters that, while they are not boundary waters are so connected that they come within the spirit of the treaty, and that therefore it recognizes that waters may be diverted for sanitary purposes, I would submit, Mr. Secretary, that while I think that argument would be perhaps a strained construction of Article III, yet the answer would be to it, in the case of Chicago, it seems to me, that this is not a case of ordinary use on the part of the Chicago Sanitary District but an extraordinary one, unprecedented in its magnitude and unparalleled in its method, by abstracting and not returning the water for the purposes of navigation.

So far as I have been able to glean any information on the subject, I cannot find that there has been any other instance of this kind where water has been abstracted in such large quantities and not returned or allowed to flow directly or indirectly back to the source from which it came. This is a case of diversion, as I said before, of a permanent and absolute character, and the loss is one that can never be recovered until the diversion is stopped.

Ordinary use, it seems to me, of such waters for sanitary and domestic purposes, means an entirely different thing with regard to boundary waters, and that is what the parties to the treaty doubtless had in view—no diversion of boundary waters, excepting for the ordinary use for sanitary purposes, and domestic purposes of citizens of both countries along the borders of boundary waters.

I submit that the third Article does not come within the purview, at least the article itself does not affect Lake Michigan, because Lake Michigan, as it seems to me, according to my reading of the treaty, is not a boundary water, and the Article III refers to boundary waters and refers to the use of boundary waters for domestic and sanitary purposes. But, if it be taken that the spirit of the treaty includes that waters may be diverted not only from waters that are boundary waters but waters which flow into boundary waters, I take it, Mr. Secretary, that it is only ordinary use, and that this is not an ordinary use, this isolated instance of a user of this kind—Chicago—and that Chicago stands alone of all cities and of all countries, so far as I have been able to obtain information on the subject, with regard to this method of abstracting large quantities of water for their dilution purposes.

I am not going to make any insinuations. I did not come here for any such purpose, Mr. Secretary. But it did occur to me, and in reading the record I noted that you, yourself, had been impressed with the idea that while the Sanitary District of Chicago, has put forth this dilution method, that they are making every effort to find some method by which they can take care of a certain excess beyond the amount they are now asking for, they do not give you any reasonable assurance that they will adopt any such method, and if they ignore well recognized methods which have been adopted in several countries, including the most enlightened countries in Europe, and also adopted in America, I say, then, there must be some substantial reason of a profitable investment in the shape of a power plant which is being run by this diversion, and, as it is pointed out in one of the reports, the report of this same Waterways Commission, in which that recommendation to which I have referred occurs, the real object of the 14,000 cubic feet per second which they were asking for at that time was to enable them to work to the full extent this power plant. The power plant was designed for the 14,000 cubic feet per second.

I want to draw your attention to this; the application, Mr. Secretary, is for 10,000 cubic feet per second, and it is said that the population of Chicago at the present time, is upward of 2,500,000 people. Well, according to the ratio to which they are entitled for dilution purposes, they are getting, if you concede them the limit they ask for, 10,000 cubic feet per second, a quantity of water for the dilution of sewage for 3,000,000 people. Therefore they must have some other purpose to serve in the meantime for getting such a large quantity in excess of actual needs.

In that connection, Mr. Secretary, it might be desirable to draw your attention to the history—although it is doubtless familiar to you—it was not familiar to me until this morning,—my attention was drawn to it in looking over the report of the Waterways Commission; I refer to the history of the permits. The first one was granted in 1899, and, by that, the Chicago Drainage District was allowed to withdraw 300,000 cubic feet per minute, which would be 5,000 cubic feet per second. That was the first permit, in May, 1899. There was a proviso in that which I will refer to in a moment. Then there was another permit granted April 9, 1901, by Mr. Root, when he was Secretary of War, and in that permit it is stated:

(PERMIT OF APRIL 9, 1901.)

" Whereas, under date of May 8, 1899, the Secretary of War granted permission unto the sanitary district of Chicago to open the artificial channel from Robey street, Chicago, to Lockport, and cause the waters of Chicago river to flow into the same upon the following conditions, *inter alia:*

"2. That if, at any time, it became apparent that the current created by such drainage works in the south and main branches of Chicago river be unreasonably obstructive to navigation or injurious to property, the Secretary of War reserves the right to close said discharge through said channel or to modify it to such extent as may be demanded by navigation and property interests along said Chicago river and its south branch."

And, whereas, it is alleged by various commercial and navigation interests that the present discharge from the river into the drainage canal sometimes exceeds 300,000 cubic feet per minute, causing a velocity of nearly 3 miles per hour, which greatly endangers navigation in the present condition of the river.

Now, therefore, this is to certify that the Secretary of War, upon the recommendation of the Chief of Engineers, hereby directs said sanitary district to regulate the discharge from the river into the drainage canal so that the maximum flow through the Chicago river and its south branch shall not exceed 200,000 cubic feet per minute.

Witness my hand this 9th day of April, 1901.

ELIHU ROOT,
Secretary of War."

That is the permit of April 9, 1901. In July following, the Sanitary District made an application that they might be permitted to divert 300,000 cubic feet per minute from the hours of 4 P.M. until 12 o'clock midnight, which was granted to them by a permit on the 22nd of July, 1901, signed by G. L. Gillespie, Brigadier General, Chief of Engineers, United States Army. That was the recommendation and it was approved by the Secretary of War.

Then on the 5th of December, 1901, that was reduced to 250,000 cubic feet per minute, to extend during the whole 24 hours, and that has continued from that day down to the present time.

Applications have been made since then. On one occasion, I understand, an application was made for 14,000 cubic feet per second, and that was refused by Secretary Taft, now President Taft.

And now, they are seeking to get this 10,000 cubic feet per second. I want to point out to you in that connection that, if in April, 1901, when Mr. Secretary Root reduced the quantity from 300,000 to 200,000 cubic feet per minute because of the danger to navigation interests, owing to the velocity of the current by reason of the 300,000 cubic feet per minute, which was only 5,000 cubic feet per second, I would ask, will not navigation interests suffer twice as much if 10,000 cubic feet per second are allowed to be diverted, or 600,000 cubic feet per minute? It seems to me that there is no doubt that that is clear, and it seems to have been the policy of your predecessors in office, Mr. Secretary, to guard jealously the rights of navigation in this matter, as the history of these permits shows.

Therefore, I say that coming back again to this recommendation, which seems to be the strong ground upon which the Sanitary District rests their case, as I gather, from the presentation of the argument by Mr. Williams, I submit that so far as that is concerned, I can do nothing better in the way of an answer to that recommendation than to read some extracts from that report. That is the report of January 4, 1907. At paragraph 21 they say that the abstraction of water from Lake Michigan has a tendency to lower the level of the waters of the lake, and of all the waters to which it is tributary, is self-evident.

I do not wish to consume too much time, and I do not intend to go into the details with regard to the injury to navigation. There are gentlemen present who can speak more accurately and definitely as to the injury caused to navigation interests than I can. But I have a statement prepared by the technical officials of the Government of Canada which shows, it seems to me, conclusively, that very material injury will be occasioned to navigation interests in Canada if this application is granted:

I draw attention to that paragraph, and, again, paragraphs 27 to 37.

"The depth in the Welland canal and in the six canals employed to overcome rapids in the St. Lawrence river is now 14 feet, of which every inch is needed."

I ask particular attention to that—the conclusion reached by this Commission—"of which every inch is needed", and the evidence which will be submitted to show, by competent witnesses as to the injury occasioned by the lowering even of one inch, so far as navigation interests are concerned, will be, I think, abundant.

"At the head of the Cornwall canal in the St. Lawrence river the abstraction of 14,000 cubic feet of water per second at Chicago will lower the surface about six and three-quarter inches at mean level and much more at low water. To restore the depth in these canals involves the reconstruction of all the end locks and deepening the approaches thereto, and is estimated to cost $2,500,000.

"The total cost of restoring the depth in the harbours of the Great Lakes and the channels between the Lakes is therefore, roughly $10,000,000, and of restoring it in the

Welland, and St. Lawrence canals is $2,500,000 additional, or $12,500,000 in all.

"The shores of the Great Lakes are very far from being fully developed, and it is highly probable that many harbours not now in existence remain to be created, or if in existence, remain to be improved. The lowering of the lakes' surfaces increases the difficulty and cost of such improvements. This consideration is of importance, although no money value can now be given it."

In that connection, Mr. Secretary, I think it will be made to appear to you by the brief which I will ask your permission to file in this case—as I will be unable to go into detail in regard to all the facts respecting the different ways—perhaps I am not warranted in saying that it will appear by that statement, but I am authorized to say that harbours have been created on the Canadian side since this report was made. For instance, Tiffin harbour, and, if I mistake not Victoria harbour, on the Canadian side. I make that statement subject to correction.

"The expenditure of the sums mentioned above will restore the depths now existing, but it will not prevent very serious annoyance to the navigation interests, during the execution of the work. The time required will be several years, and, in the meantime, the vast commerce of the Great Lakes will be hampered, not only by deficient depth, but also by the occupation of the channels, already crowded with commerce, by the excavating machines.

"It is evident from the foregoing that large bodies of water cannot be diverted by the Chicago Drainage canal without very serious detriment to the navigation interests of the Great Lakes and of the St. Lawrence valley. The greater the amount of water diverted the greater the injury.

Chicago being one of the principal lake ports, there will be very few communities which will feel this detriment more than she will."

Then they say, with regard to a branch of the matter that does not come up directly before you in this connection, with regard to the diversion, so far as power is concerned—

"In the presence of these interests, the effect upon Niagara falls may be simply mentioned with a reference to our former reports upon that subject. The volume of Niagara falls will be reduced by the full amount diverted at Chicago."

I am in a position to state by reason of the expert evidence which I have—and this is contained in this brief—that about four times the power would be generated if the water were allowed to go down in its natural course in the St. Lawrence river than could possibly be generated by the works at Lockport.

Then there is a paragraph, Mr. Secretary, in which it is said:

"The extension of the dilution method to the outlying territory is not the only way to preserve the lives and health of the people of Chicago. The application of this method, with flow of 10,000 and 14,000 cubic feet per second, respectively, for the area tributary to the present Drainage Canal, will serve populations not exceeding 3,000,000 and 4,200,000 respectively. For greater populations, other methods of sewage disposal will be required.

Then, in the summary, under (n):

"The diversion of 10,000 cubic feet per second will lower the levels of Lake Michigan-Huron, Lake St. Clair, Lake Erie, Lake Ontario, and the St. Lawrence River, besides the important connecting channels, the Detroit and

St. Clair Rivers, by amounts varying from 4¼ to 6¼ inches for the different waters, and the diversion of 14,000 cubic feet will lower them from 6 to 8½ inches. The diversion of 20,000 cubic feet will lower Lake Michigan-Huron about 13 inches and Lake Erie about 11 inches."

Then, under (o):

"The lake traffic which passed through the Detroit River in 1905 was about 58,000,000 tons, valued at $615,000,000. It is increasing annually with marvellous rapidity. The records for the year 1906, so far as they are made up, indicate that the number of tons which passed through the Detroit River in 1906 exceed 65,000,000, valued at $690,000,000. The lowering of the water surface has a very injurious effect upon this traffic, and upon that of the Welland and St. Lawrence canals. Chicago being one of the principal lake ports, there will be very few communities which will feel the injury more than she will."

Now, Mr. Secretary, I just want to refer briefly to one or two points, and I shall have concluded.

General Bixby, in a report of the Special Board of Engineers, which was signed by General Bixby as the Chief of Engineers, and the other gentlemen who were members of the Board, dated January 23, 1911, page 8, said:

"For purposes of navigation a diversion from Lake Michigan of less than 1,000 second-feet of water is all that will be necessary. For purposes of sanitation the works of the Sanitary District of Chicago were designed to allow the diversion of 10,000 second-feet and now contemplate a total of 14,000 second-feet, the additional 4,000 second-feet to be obtained by the diversion of water through the Calumet River, and a connecting canal following the Sag route. The War Department, while awaiting the definite action of Congress, has so far permitted the diversion of 4,167 second-feet, and the Sanitary District is understood to be using about 7,000 second-feet. As the water which is at present being diverted from the Lakes appears to have already seriously affected the navigation of its harbors and connecting waterways, prompt Congressional action is recommended to limit the diversion."

I submit that on that report, we could rest our case, and say that there is testimony of an unimpeachable character, which establishes our case as showing serious injury to navigation. As I understand it, that is all that is necessary, and that would suffice to warrant you, Mr. Secretary, in refusing this permit.

Then he proceeds:

"While it appears to have been assumed that the Sanitary District may be allowed to divert 10,000 second-feet so long as actually necessary for sanitary purposes, the diversion of the waters of the Great Lakes from their natural outlet for power development alone is inadmissible, under the recent treaty between the United States and Great Britain. The future diversion of water from Lake Michigan for any purpose is fraught with difficulties. Not only has Canada an interest in the maintenance of lake levels which the United States must recognize, but every foot of water flowing through the Chicago Drainage Canal lessens the flow at Niagara Falls and at the power sites along the St. Lawrence River, where, due to the fall available, the same amount of water will create about four times the power that can be generated from it on the Desplaines and Illinois Rivers. The treaty enables riparian owners of Canada, as well as of the United States, who consider themselves injured by such diversion to bring suit in the United States courts to protect their interests. The claim that more than 1,000 cubic feet per second is required for purposes of navigation cannot be maintained. The treaty, however, recognizes as proper the use of water for sanitary purposes, and it is the opinion of the Board that only such water should be diverted from Lake Michigan as is indispensable for sanitation, and then, only with a provision for proper compensating works in the outlets of the lakes to prevent a lowering of their levels. Water thus diverted may be used incidentally for power purposes, but care must be exercised in authorizing the diversion of water for sanitary purposes to restrict it to the amount necessary for those purposes alone."

I feel, Mr. Secretary, that I have to hurry, because I am even now, trespassing upon the time that others could occupy to better advantage than I can. However, I want to make a few references to the technical aspect of the case.

There is a table submitted in this brief which I will ask your permission to file with you, at page 13. This shows loss of level on Lakes Huron, Erie, Ontario, and the St. Lawrence River under the actual diversion and under assumed diversion of 10,000 and 14,000 cubic feet per second, through the Chicago Drainage Canal. I will take time—for it will only take a moment—to read this table. It is as follows:

Lake.	Loss of Levels		
	Actual Diversion	Assumed Diversion of	
		10,000 c.f.s.	14,000 c.f.s.
	Inches.	Inches.	Inches.
Michigan-Huron	3·07	7·4	10·3
Erie	2·6	6·1	8·6
Ontario	1·9	4·5	6·3
Rapide Plat	2·8	6·8	9·6
Cornwall Canal	2·1	5·0	6·9
Coteau	2·2	5·4	7·6
Montreal	4·3	10·25	14·4
Lanoraie	2·2	5·4	7·6
Sorel	2·5	6·0	8·4

It was urged in the argument of Mr. Williams, in answering some gentlemen who had expressed their views in opposition to the diversion, that the fluctuations and oscillations of Lake Michigan and other lakes, and the cycles that were referred to as occurring about every ten years, had the effect of actually lowering the lakes to a lower point than they had reached yet, with the diversion, and, in that connection, the year 1895 was referred to. As I gathered from Mr. Williams' argument, he rather intimated that as navigation had to meet conditions of that kind from natural causes, it would not be very difficult for them to meet a further lowering, say, of six inches, which was the amount that General Bixby said would be the lowering by reason of this 10,000 cubic feet per second diversion. It must be recognized that there is a fallacy in that argument, because no matter what the natural lowering, you have to add the six inches, and it makes it a great deal worse when we meet these periods when natural conditions make it lower.

SECRETARY STIMSON: The same argument is made in this Joint Commission report.

MR. MULLIN: Yes; but it seems to me it is only necessary to state it to see the fallacy and to realize that it is really an argument that can be turned against the person who makes it, as it is because of the fact that nature does, at times, reduce the levels to such an extent, that it is so incumbent upon those who have the guardianship of those waters for the protection of the navigation of both countries that every care should be exercised that no artificial diversion should be made, or cause occur by which the natural levels should be lowered.

Now, Mr. Secretary, as I said before, I ought not to take up further time. There are many points here that I would like to draw to your attention, but I do not wish to weary you, and you will have them before you in the brief.

SECRETARY STIMSON: I would be glad to consider the brief.

MR. MULLIN: I will conclude, therefore, by stating that in view of the fact that both countries have so much at stake in regard to the great interior sections of both countries, which this unparalleled water system enables them to utilize to the best advantage, by means of transportation, it would be a very grave mistake if anything should be done on either side of the line to cause the lowering of the levels of that great waterway system; and, therefore, on behalf of Canada, I object to any diversion being granted, and I submit that this application should be refused.

Secretary Stimson: May I ask you a question or two to see if I understand the scope of your argument?

Mr. Mullin: Certainly.

Secretary Stimson: In the first place, you argue that, under the treaty, Canada and Canadian citizens have the same rights of navigation in all of the Great Lake harbours, even on the American side, that Americans have, and that includes Lake Michigan and also the Chicago River, so that they are interested as well as Americans in any possible obstruction to the Chicago river ?

Mr. Mullin: Yes.

Secretary Stimson: That is the general right under the general treaty ?

Mr. Mullin: Yes, Mr. Secretary.

Secretary Stimson: Then, under Article III of the Treaty, I understand that you do not claim that Lake Michigan is a boundary water, and that therefore Article III does not apply ?

Mr. Mullin: I am not contending that it is, Mr. Secretary, because so far as I am concerned—

Secretary Stimson: For that reason you do not invoke the provision which forbids any diversion affecting the natural level except by authority of the respective countries and with the approval of the Joint Commission ?

Mr. Mullin: I do say this, Mr. Secretary, and I have mentioned it in the brief I am submitting: That the spirit of the treaty seems to indicate—

Secretary Stimson: I understand that—

Mr. Mullin: I was going to say that I would ask that Canada's rights should be reserved in the event of the authorities in Canada coming to the conclusion that this is a question that ought to be referred to the Joint Commission. I do not say that I am insisting upon it. I am not insisting on it, and I do not raise the question here now because I bow to your jurisdiction in the matter; but I would like to have a reservation on that point, so that it could be open to Canada hereafter if Canada saw fit to assume that attitude as to whether the matter could be referred to the Joint Commission.

Secretary Stimson: But for the point of the argument now, you do not base your argument on Article III.

Mr. Mullin: No, I do not. I simply raise it to meet the point that it might be said that under the treaty the right was recognized to divert even boundary waters for sanitary purposes. Then I say it is only for ordinary use—

Secretary Stimson: And then, under Article II, there seems to be a provision that outside of boundary waters the treaty does not affect the rights of either Government, except to give the citizens the same rights as if they lived on the side where the diversion was granted.

Mr. Mullin: In the first clause of the Article, that is quite true; but there is the second clause, which gives either country the right to object to any diversion.

Secretary Stimson: In other words, it preserves the *status quo*?

Mr. Mullin: Yes, it preserves the *status quo*.

Secretary Stimson: As if the treaty had not been made.

Mr. Mullin: And, considering the spirit of the treaty, it is that the boundary water levels should be maintained, and it seems to me, effect should be given to that second clause, that, if the effect of diversion would be made clear, that it would affect boundary waters so as to produce material injury. It seems to me that that would be the fair construction to put upon that.

SECRETARY STIMSON: I was trying to find the basis on which you stood to-day in your argument, and it seems to me that on your statement now you stand on the same basis, claiming under the treaty the right of the Canadian Government to appeal to the jurisdiction of the Secretary of War under the law of the United States.

MR. MULLIN: Yes.

SECRETARY STIMSON: And not by reason of any special treaty provision?

MR. MULLIN: Under that treaty provision, I think I have the right to invoke that. I think under the second clause of Article II, I have the right to invoke that and to raise the objection on the part of Canada that this is a diversion that would affect boundary waters.

SECRETARY STIMSON: I think you would have the right under the general treaty, that the Government would have a right to call my attention to interference on any part of the Great Lakes, whether on your side or ours, because, under the treaty, Canadian citizens have the same right of navigation that American citizens have; but I am trying to find out whether you claim any additional specific contract rights, so to speak, arising out of the provision of the treaty.

MR. MULLIN: Only such as are given under the secondary clause of Article II. I may say, Mr. Secretary, in that connection, that so far as private interests are concerned—perhaps that will be dealt with by other gentlemen who will address you and who will speak for interests so far as Canada is concerned—but, it would seem to me, speaking for Canada, that very little advantage would be taken of that first clause if injury were occasioned to the rights of citizens who are not residents of the United States, because it would be a very onerous and difficult thing for them to undertake—for individuals to undertake suits of that character in the courts of another country. It would involve a great deal of costs, and unless there were very substantial injuries it seems to me very doubtful if that provision of the treaty would be availed of by any one who was affected. It seems to me that it is a public matter and it is for the country affected to raise the question under the second clause of the treaty. I invoke that second clause, and I also stand on the general rights under the treaty obligations of the two countries, and also the comity existing between the countries.

SECRETARY STIMSON: I think I understand it.

MR. MULLIN: My attention has been directed by my colleague, Mr. King, to Article III. Mr. King, who is associated with the other interests represented by gentlemen here, points out that, so far as Article III is concerned, it has a relation to the question before you, Mr. Secretary, because it provides: "That, in addition to the uses, obstructions and diversions heretofore permitted, or hereafter provided for by special agreements between the parties hereto, no further or other uses or obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line, affecting the natural level or flow of boundary waters on the other side of the line, shall be made except by authority of the United States or the Dominion of Canada within their respective jurisdictions and with the approval, as hereinafter provided, of a Joint Commission, to be known as the International Joint Commission."

It was in this way that I asked for the reservation in regard to having the question hereafter raised, if it was thought advisable to have it hereafter submitted to the

International Joint Commission, that it does, incidentally, affect the boundary waters because it is a diversion of waters incidentally affecting boundary waters. Although Lake Michigan may not be considered boundary waters, any diversion from that lake does, directly, affect boundary waters, and, therefore, it might come within the provisions of Article III.

SECRETARY STIMSON: I see your point, sir.

MR. MULLIN'S brief is as follows:

OTTAWA March 25th, 1912.

To the Honourable
The Secretary of War of the United States.

SIR,—

Re: application of the Board of Trustees of the Sanitary District of Chicago for enlargement of the term of the instrument executed by the Secretary of War, May 8, 1899, and, as modified by subsequent instruments touching the flow of the water from Lake Michigan through the Canal of the Sanitary District of Chicago, so as to permit the withdrawal from lake Michigan through the Chicago and Calumet rivers of water not to excede 10,000 c.f.s.

Brief submitted on behalf of the Government of Canada in opposition to the above application.

The proposed diversion so far as it affects navigation not only upon boundary waters but also upon the waters of lake Michigan and the St. Lawrence river, from the point where it ceases to be a boundary water, as well as the canal system, presents serious objections from the Canadian standpoint to the granting of the permit asked for.

First, dealing with the legal aspect of the case, it must be borne in mind that, by the terms of the second clause of Article I of the International Boundary Waters Treaty, it is "agreed that so long as this Treaty shall remain in force, the same right of navigation shall extend to the waters of lake Michigan and to all canals connecting boundary waters, and now existing or which may hereafter be constructed on either side of the line", as is given by the first clause of that Article with respect to boundary waters, that is to say, "that the navigation of all navigable boundary waters shall forever continue free and open for the purposes of commerce to the inhabitants and to the ships, vessels and boats of both countries equally, subject, however, to any laws and regulations of either country, within its own territory, not inconsistent with such privilege of free navigation and applying equally and without discrimination to the inhabitants, ships, vessels, and boats of both countries."

It will thus, be seen that the second clause of Article I secures to Canada free and unobstructed navigation of the waters of lake Michigan from which the proposed diversion is to be made. In other words, it secures to Canada, in express terms,the right to navigate those waters in any manner which the natural flow will permit. It is submitted, therefore, that any interference with the natural flow which decreases the navigable capacity of lake Michigan or renders its navigation difficult in any way, is an infringement of the letter and spirit of the treaty.

The right to navigate necessarily implies that vessels of both countries plying on lake Michigan shall be entitled to make all harbours including Chicago, without being subjected to perils not ordinarily incident to the navigation of lake Michigan. It has been shown, by reason of the diversion of 4,167 c.f.s. now existing, the current in the Chicago river is of such velocity as to render it extremely detrimental to the safe handling of vessels, and any increase in the volume of the diversion would be fraught with disaster to vessels using the port of Chicago. The testimony of those representing these interests is to the effect that the diversion already existing renders the navigation of vessels, bound to and from the port of Chicago, extremely hazardous having, it is said already caused loss of life and property by reason of the swift current arising from such diversion. A large number of vessels are engaged in the carrying trade between Chicago and Canadian ports, chiefly laden with grain outward from Chicago, and these vessels while plying to and from this latter port are exposed to perils by the extreme current caused by the diversion of the waters of lake Michigan through the Chicago river, a danger which will become greatly augmented if the increased flow asked for is permitted.

The diversions for power purposes at Niagara Falls on either side of the line are not analogous as they do not affect navigation, the water taken being returned again and the levels in the navigable portions are not lowered. But, the diversion at Chicago from which there is no return, on the other hand, means an absolute and permanent lowering of the levels of the Great Lakes system from Sault Ste. Marie to the head of the tide at lake St. Peter on the St. Lawrence river. It is of the highest importance that the Great Lakes system on the boundary between the United States and Canada and finding its outlet by the St. Lawrence to the sea, so vital to the prosperity of the great interior sections of both countries, should be maintained in its integrity.

It is significant, that while the framers of the International Boundary Waters Treaty, basing their work on that of the International Waterways Commission, accepted the latter's suggestion as to the diversion on the Canadian side at Niagara Falls, and increased the amount to be diverted on the United States side to 20,000 c.f.s., they evidently ignored the Chicago Drainage canal regarding which the Waterways Commission had suggested that the diversion should be limited to 10,000 c.f.s. The fair inference is that neither country agreed to the recommendation of the Waterways Commission that the diversion from lake Michigan to the Chicago Drainage canal should not exceed 10,000 c.f.s. At all events in the absence of any mention of the Chicago Drainage canal in the Treaty, it is contended that Canada never agreed to the proposed diversion of 10,000 c.f.s. The spirit of the treaty indicates that the levels of boundary waters on one side are not to be disturbed by works or diversions on the other without proper approval.

It will be observed that by the second clause of Article II of the Treaty, it is declared "that neither of the high contracting parties intends by the foregoing provision [clause 1 of Article II, reserving exclusive jurisdiction and control over the use and diversion of all waters on its own side of the line which, in their natural channels, would flow across the boundary or into boundary waters] to surrender any right which it may have to object to any interference with, or diversions of, waters on the other side of the boundary the effect of which would be productive of material injury to the navigation interests on its own side of the boundary".

This second paragraph of Article II expressly opens the door to Canada to object to any diversion of waters of lake Michigan to the Chicago Drainage canal so far as such diversion would be productive of material injury to the navigation interests on the Canadian side of the boundary.

Article III dealing with "boundary waters" provides that in addition to the uses, obstructions and diversions heretofore permitted "no further or other uses or obstructions or diversions whether temporary or permanent of boundary waters on either side of the line, affecting the natural level or flow of boundary waters on the other side .. .. shall be made except by *authority of the United States or Dominion of Canada,* within their respective jurisdictions *and with the approval" of the International Joint Commission.* The final clause, after stating that the foregoing does not limit the right of either country to carry on dredging for the deepening of the channels within their own territory, provided the level or flow of water on the other side is not *materially* affected, closes as follows: "nor are such provisions intended to interfere with the *ordinary* use of such [boundary] waters for domestic and sanitary purposes".

Bearing in mind the scope and object of the treaty, embracing, as it does, the conservation of boundary waters and the maintenance of lake levels, any diversion from their natural channels of waters on either side of the boundary which materially affects the levels of boundary waters, is a violation of the spirit, if not the letter, of the treaty.

In this connection a very grave question arises as to whether the Chicago Drainage canal is not a matter which might properly be referred to the International Joint Commission under the treaty, but, without insisting on that course at the present time, Canada expressly reserves the right to raise the question at a subsequent stage if it should be deemed expedient to adopt that attitude.

Another consideration which, it is submitted, ought not to be lost sight of is, that the diversion of 10,000 c.f.s. proposed for the Chicago Drainage canal is not an "ordinary use" for sanitary purposes, but an extraordinary use, unprecedented in its magnitude and unparalleled in its method of abstracting and not returning the water after using it for sanitary purposes, whereas the Treaty contemplates " only *ordinary use* for domestic and *sanitary* purposes."

Then again, as the United States Government Engineers consider 1,000 c.f.s.—10 per cent. of the Sanitary District's application—sufficient for navigation, the question arises: is the balance of 9,000 c.f.s. necessary for the "ordinary use" of sanitation purposes. It is submitted that the diversion of such an immense quantity of water for sanitary purposes is not an "ordinary use" when it is remembered that it is a solitary and isolated instance of such user. If Chicago is to demand large bodies of water for diluting sewage, its demands on lake Michigan will depend on its continued growth, and other cities and towns —following the precedent of Chicago—will be just as much entitled to adopt similar dilution methods for treating sewage by the abstraction of large quantities of water, if they find such a course practicable, with disastrous results to the Great Lakes waterways system.

Referring to the diversion of water through the Chicago Drainage canal, the report of a special Board of Engineers, which is signed by General W. H. Bixby, Chief of Engineers, United States Army, dated January 23, 1911, at pp. 8-9 says:

" For purposes of navigation a diversion from Lake Michigan of less than 1,000 second-feet of water is all that will be necessary. For purposes of sanitation the works of the Sanitary District of Chicago were designed to allow the diversion of 10,000 second-feet and now contemplate a total of 14,000 second-feet, the additional 4,000 second-feet to be obtained by the diversion of water through the Calumet River and a connecting canal following the Sag route. The War Department, while awaiting the definite action of Congress, has so far permitted the diversion of 4,167 second-feet, and the Sanitary District is understood to be using about 7,000 second-feet. As the water which is at present being diverted from the lake appears to have already seriously affected the navigation of its harbors and connecting waterways, prompt Congressional action is recommended to limit the diversion.

" While it appears to have been assumed that the Sanitary District may be allowed to divert 10,000 second-feet so long as actually necessary for sanitary purposes, the diversion of the waters of the Great Lakes from their natural outlet for power development alone is inadmissible under the recent treaty between the United States and Great Britain. The future diversion of water from Lake Michigan for any purpose is fraught with difficulties. Not only has Canada an interest in the maintenance of lake levels which the United States must recognize, but every foot of water flowing through the Chicago Drainage canal lessens the flow at Niagara Falls and at the power sites along the St. Lawrence river, where, due to the fall available, the same amount of water will create about four times the power that can be generated from it on the Des Plaines and Illinois rivers. The treaty enables riparian owners of Canada, as well as of the United States, who consider themselves injured by such diversion, to bring suit in United States courts to protect their interests. The claim that more than 1,000 cubic feet per second is required for purposes of navigation cannot be maintained. The treaty, however, recognizes as proper the use of water for sanitary purposes, and it is the opinion of the Board that only such water should be diverted from Lake Michigan as is indispensable for sanitation, and then only with a provision for proper compensating works in the outlets of the lakes to prevent a lowering of their levels. Water thus diverted may be used incidentally for power purposes, but care must be exercised in authorizing the diversion of water for sanitary purposes to restrict it to the amount necessary for those purposes alone."

Extract from Appendix E, attached to the Chicago Harbour Commission Report (1909), where General W. H. Bixby, at page 313, says:

"There is another feature, while I am on the harbourage of Chicago—the Chicago river affects the entire Great Lakes system. The interests of all other harbours on the Great Lakes are entitled to a great deal of consideration in anything that is done in the Chicago river."

And, again, on the same page:

"The War Department holds every engineer in charge of districts responsible for protecting and safeguarding navigation needs of the general public. That includes the commerce on the Great Lakes that wants to come to Chicago, just as much as the commerce of Chicago itself that does not get outside Lake Michigan."

The report of the International Waterways Commission, dated January 4, 1907, at page 180, says:

"The depth in the Welland canal and in the six canals employed to overcome rapids in the St. Lawrence river is now 14 feet, of which every inch is needed. At the head of the Cornwall canal in the St. Lawrence river the abstraction of 14,000 cubic feet of water per second at Chicago will lower the surface about 6¾ inches at mean level and much more at low water. To restore the depth in these canals involves the reconstruction of all the end locks and deepening the approaches thereto, and is estimated to cost $2,500,000.

"The total cost of restoring the depth in the harbours of the Great Lakes and the channels between the lakes is therefore roughly $10,000,000, and of restoring it in the Welland and St. Lawrence canals is $2,500,000 additional, or $12,500,000 in all.

"The shores of the Great Lakes are very far from being fully developed, and it is highly probable that many harbours not now in existence remain to be created, or, if in existence, remain to be improved. The lowering of the lakes' surfaces increases the difficulty and cost of such improvements. This consideration is of importance, although no money value can now be given it.

"The expenditure of the sums mentioned above will restore the depths now existing, but it will not prevent very serious annoyance to the navigation interests during the execution of the work. The time required will be several years, and in the meantime the vast commerce of the Great Lakes will be hampered, not only by deficient depth, but also by the occupation of the channels, already crowded with commerce, by the excavating machines.

"It is evident from the foregoing that large bodies of water cannot be diverted by the Chicago Drainage canal without very serious detriment to the navigation interests of the Great Lakes and of the St. Lawrence valley. The greater the amount of water diverted the greater the injury. Chicago being one of the principal lake ports, there will be very few communities which will feel this detriment more than she will.

"In the presence of these interests the effect upon Niagara falls may be simply mentioned with a reference to our former reports upon that subject. The volume of Niagara falls will be reduced by the full amount diverted at Chicago."

Again, the same report, at page 181, states:

"The Chicago Drainage canal having been constructed with a capacity, as it turns out, of 14,000 cubic feet per second, full power development will call for the whole of that amount, and, in fact, power works are now under construction at Lockport to utilize it. Inasmuch as the sanitary requirements by the standard, fixed in the state law, are only 6,667 cubic feet per second for the present population of 2,000,000, it is evident that power development, incidental though it be, does lead to demands for waters not required for sanitary purposes."

The same report, again, at page 184, says:

"The diversion of 10,000 cubic feet per second will lower the levels of lake Michigan-Huron, lake St. Clair, lake Erie, lake Ontario, and the St. Lawrence river, besides the important connecting channels, the Detroit and St. Clair rivers, by amounts varying from 4¼ to 6¼ inches for the different waters, and the diversion of 14,000 cubic feet will lower them from 6 to 8½ inches. The diversion of 20,000 cubic feet will lower lake Michigan-Huron about 13 inches and lake Erie about 11 inches.

"The lake traffic which passed through the Detroit river in 1905, was about 58,000,000 tons, valued at about $615,000,000. It is increasing annually, with marvellous rapidity. The records for the year 1906, so far as they are made up, indicate that the number of tons which passed through the Detroit river in 1906, exceeded 65,000,000, valued at $690,000,000. The lowering of the water surface has a very injurious effect upon this traffic, and upon that of the Welland and St. Lawrence canals."

And, at page 211, it states:

"The extension to the Calumet region of the method of sewage disposal already applied to the Chicago river is not necessary to preserve the health of Chicago, there being other and better methods available for the Calumet region.

The final cost of these methods is somewhat greater than that of the one proposed, but the works can be developed as the population increases, and only a part of their cost need be incurred at present, while their greater efficiency justifies the increase of final cost."

By Article XXVI of the Treaty of Washington, May 8, 1871, it was provided that "The navigation of the river St. Lawrence, ascending and descending from the 45th parallel of north latitude, where it ceases to form the boundary between the two countries, from, to, and into the sea, shall forever remain free and open for the purposes of commerce to the citizens of the United States, subject to any laws and regulations of Great Britain or of the Dominion of Canada not inconsistent with such privilege of free navigation." It is, therefore, apparent that the Government of the United States, equally with that of Canada, has a direct interest in protecting the navigation of the river St. Lawrence, as it appears that the free navigation of that river is open in perpetuity to citizens of the United States where it passes wholly through Canadian territory.

The State of Illinois, in response to the Treaty of Washington, (May 8, 1871), by Act of the General Assembly, approved April 4, 1872, granted "The use of the Illinois and Michigan canal, and all other canals that may be constructed by this State" to the citizens of the Dominion of Canada, on equal terms with citizens of the United States.

By treaties now in force, the Great Lakes waterways from lake Superior to the sea, including all boundary waters as well as lake Michigan in the United States, all connecting canals and the St. Lawrence river including that portion which flows wholly through Canadian territory, are open to the free navigation of both countries. The United States and Canada are equally concerned in maintaining unimpaired this great water highway for the benefit of the commerce of both countries.

In view of objections arising from the impossibility of preserving navigation unimpaired on the boundary waters, treaty rights covering such waters and the navigation of lake Michigan and the St. Lawrence to the sea, international relations and comity as well as the impossibility of providing adequate compensation for injury to Canadian interests, both public and private, it is urged that the permit asked for, should not be granted.

That the proposed diversion will be productive of material injury to the navigation interests on the Canadian side of the boundary, there is abundant evidence, a statement of which has been prepared by technical officers from the Canadian Government Departments of Public Works, Naval Service, and Marine and Fisheries, also the Montreal Harbour Commission, as follows:

In the following memorandum it is proposed to show that a diversion of 10,000 c.f.s. at Chicago through the Drainage canal will lower the water of all the lakes below Sault Ste. Marie, as well as of the St. Lawrence river as far east as lake St. Peter.

That it will entail heavy losses upon Canada for the restoration of the lost depths in harbours and channels in the Great Lakes and St. Lawrence river.

That Canada must expend large sums on her canal system to render it as useful as it was designed to be.

That it will cause heavy loss to the inland marine interests and to shipping below Montreal, by reducing the draft and carrying capacities of the vessels.

That much of this loss must be borne by the consumer.

That many outlying shoals will be more dangerous to navigation under the new conditions than at present.

That injury will be done to many owners of private wharves by reason of the depth of water at, and approaching them, being reduced.

That injury will be done to many wharves and breakwaters that have been constructed of concrete on wooden cribs, by reason of the wood becoming exposed to the air for long periods, allowing rot to set in and imperilling the superstructure.

That granting 10,000 c.f.s. for power means a huge waste of energy as the same amount of water would generate much more power by the other route.

That the diversion of any quantity of water from lake Michigan will lower the levels of all the lakes below Superior, hardly requires proof in these days, but the case may be stated briefly:

As the promoters and backers of the scheme assert, it is impossible to show on the lake shore, or on a gauge, the effect of a diversion. One cannot see, at the same time, the water level under natural conditions and under diversion but the loss can be demonstrated as surely as any mathematical problem.

The following table will show the mean level of the lakes for 52 years and the lowest monthly mean.

Lakes	Mean of 52 Years	Lowest Monthly Mean
Huron-Michigan	581·35	578·98
Erie	572·59	570·70
Ontario	246·18	243·41
St. Lawrence R. (Rapide Plat)	224·8 (mean of 28 yrs.)	221·44
" (Head of Cornwall Canal)	201·07 " "	198·05

It is found by measurement and computation (see Report of International Waterways Commission on the Regulation of Lake Erie, p. 53), that the discharge of Lake Huron at Port Huron is 16,300 c.f.s. more when the lake surface has an elevation 580, than when it has one of 579; or, one foot of rise (near low water) means a difference in discharge of 16,300 c.f.s. Therefore, an increased discharge of 10,000 at or near low water means a lowering of $\frac{10,000}{16,300}$ ft. or 7·4 inches.

If lake Huron suffers a decrease in discharge of 10,000 c.f.s. at Port Huron, lake Erie suffers a decrease in supply of the same amount which may be treated as an increase in discharge causing a loss of level. The same remark applies to lake Ontario and the St. Lawrence river as far as tide water.

In lake Erie the change in discharge for one foot change of level near low water, is 19,600 c.f.s. Therefore, an increase in discharge of 10,000 c.f.s. means a lowering of $\frac{10,000}{19,600}$ ft. or 6·1 inches.

In lake Ontario the change in discharge for one foot change of level near low water is 26,800 so that an increase in discharge of 10,000 c.f.s. means a lowering of $\frac{10,000}{26,800}$ ft. or 4·5 inches.

At Rapide Plat, in the St. Lawrence river, the increment is 17,500 and the lowering is 6·8 inches.

At the head of the Cornwall canal the increment is 24,350 and the lowering 5 inches.

Loss of level on lakes Huron, Erie, Ontario and the St. Lawrence river under the actual diversion and under assumed diversions of 10,000 and 14,000 c.f.s. through the Chicago Drainage canal:

Lake.	Loss of Level		
	Actual Diversion	Assumed Diversion of	
		10,000 c.f.s.	14,000 c.f.s.
	Inches	Inches	Inches
Michigan-Huron	3·07	7·4	10·3
Erie	2·6	6·1	8·6
Ontario	1·9	4·5	6·3
Rapide Plat	2·8	6·8	9·6
Cornwall Canal	2·1	5·0	6·9
Coteau	2·2	5·4	7·6
Montreal	4·3	10·25	14·4
Lanoraie	2·2	5·4	7·6
Sorel	2·5	6·0	8·4

It is represented in the pleadings of the applicants that the fluctuations of the lake levels, some of which are undulations of surface recurring every few minutes, some of which are larger fluctuations occasioned by storms and barometric changes, others of which are semi-annual, the level being highest in summer and lowest in winter, and, still others extending over long periods or cycles of say seven to ten years, are so great and so irregular that a lowering of the lake levels of even six or eight inches cannot be distinguished and is not, therefore, detrimental in practice to navigation interests, because vessels must always load so as to be prepared for the lowest levels of water which are likely to occur during the time of any trip. This is denied on behalf of Canada because whatever might be the natural level of the lakes, at any particular season or moment, that level would always be reduced by artificial lowering. If, for example, it would at a high water season or high water moment, under natural conditions, be 24 inches above the average level it would, by the artificial lowering of 7 inches, be reduced to only 17 inches above the average; and, if at a time of low water when under natural conditions the level would have been 24 inches below average, it would, by the artificial lowering, be reduced to 31 inches below the average; and, as the practice of the larger vessels is to load to the greatest safe draft in time of high water as well as in time of low, the reduction of level would be detrimental in time of high water as well as in time of low, and the detrimental effect of artificial lowering of the water would therefore be felt at all times and under all conditions.

For example since 1900 there have been only 17 months in which the level of the lake has been as high as the average of 52 years (viz. 581·35). In every case had this diversion been in existence the level would have been below. In addition to this in five months in that time the lake would have been lower than the lowest mean 579·0.

As the water at the foot of the Sault Ste. Marie canal is only from a foot to a foot and a quarter above that of lake

Huron it follows that any fall of lake level will cause a similar drop at the canal, the lower sill of which is a barrier that all vessels trading to lake Superior must pass. When lake Huron is at its extreme low level of 579·0 the Poe lock sill will have over it only 17·43 feet, and the Canadian 17·76 feet. Reduce this by 7·4 inches when each inch in draft means 25 to 110 tons of freight according to size of vessel, and it will be seen what a heavy toll will be exacted from the lake carriers.

In the St. Lawrence river any interference with the depth is very serious. All freight vessels passing east, take advantage of the smaller rapids, such as those opposite Cardinal, Rapide Plat, and Farrans Point, to shorten the passage by escaping the tedious process of locking down. In rapide Plat these vessels experience no difficulty at mean water, but, when a less depth rules, they either take the canal or lighten their cargoes. Take six inches off the depth, the rapids must be avoided during all low water seasons.

When the dredging operations were undertaken a few years ago certain depths were decided upon and the vessels trading to the various ports always load to the last inch allowed. A reduction of this depth makes it impossible to load so deeply and the harbours and channels must be dredged to allow trading under the old favourable circumstances.

An approximate estimate, by officers of the Canadian Department of Public Works, of the amount that will be required to place the harbours in lake Huron, lake St. Clair, lake Erie, lake Ontario, Detroit river, St. Lawrence river, not including entrances to canals near Montreal harbour, in the same condition as without diversion places the cost at not less than $11,367,000.

All canals have been designed for a certain draft at low water, Sault Ste. Marie 18 feet and the others 14 feet. If this diversion be permitted five to eight inches will be taken from these depths and much of their usefulness will be gone.

At Sault Ste. Marie, to repair the damage done by this diversion will mean the reconstruction of nearly the whole lock, because the lower sill and bottom must be lowered over seven inches. In addition the lower approach for a long distance must be deepened the same amount.

The same remarks apply to the upper and lower locks, the guard locks, the upper and lower approaches and the upper reaches of the Welland, Galops, Morrisburg, Farrans Point, Cornwall, Soulanges, and Lachine canals, the lower lock and entrance to the Trent and Rideau canals, and the deepening of the Murray canal and approaches in in which there is no lock. The engineers of these canals estimate the cost of this work at not less than $6,640,000.

Montreal, Canada's national harbour, with its 160 miles of improved channel and approaches, will suffer from this loss of water. The river will be affected from Montreal to tide water. Many millions of dollars have been spent in deepening and improving the channel. As autumn approaches the minimum depth of thirty feet is only available and vessels are compelled to observe great care in loading˙ Any reduction in this is serious to the vessel owner, the shipper and consumer. The lakes, to a large extent, feed the river and any diversion causing a diminution of supply from them must be opposed.

To restore depths in Montreal harbour and the ship channel it is estimated will cost not less than $930,000.

From these figures from Canadian harbours, Canadian canals, Montreal harbour and the ship channel, it will be seen that $18,937,000 at least will be required to restore conditions, as regards depths upset by this proposed diversion through the Chicago Drainage canal. This amount would be really a contribution from Canada to that work and should be considered in striking estimates for comparing that project with other means of sewage disposal.

From this it will be seen what an effect this diversion will have upon the most important inland waterway in the world. The damage is not only to the lakes, but to the immense works that have been constructed that we may derive the very fullest advantage from them, viz. the connecting rivers, canals, and harbours. Whilst the United States Government is interested in expenditures necessary to restore depths in its Soo canals, improved rivers, St. Clair Flats canals, and numerous harbours, Canada is vitally concerned in the same way in her harbours, her unequalled canal system and her national port of Montreal.

To allow anything to impair such vast improvements would be a retrograde movement in two ways, namely, sacrificing work already completed and allowing a loss of valuable water for dilution of sewage that might, and should have been, attended to by other more modern and sanitary methods. Other cities less wealthy and less important are compelled to look after their sewage without injuring neighbouring communities and why not Chicago? Had the divide not been there they would have ere this completed the sewage disposal plant that must be undertaken very soon.

This loss in carrying capacity will be felt not only in nearly all the autumn months when we experience the annual low water, but also in all except the very high water years, it will mean earlier, longer and more frequent periods of low water, such as pertain now, as well as a lower low water than nature intended. In the autumn, grain from the western provinces is rushed to the head of lake Superior and it takes the whole fleet all its time to prevent the elevators being filled before the close of navigation. If the carrying capacity of every boat is reduced from 150 to 100 tons each trip, congestion is sure to come and this is a condition the Canadian Government is trying to prevent.

That these seemingly small changes are important and divert traffic may be seen from the fact that in 1905, when the water in lake Huron reached a minimum of 580·66 during the season of navigation and had a mean level for the year of 580·95, there passed east through the American canals at the Soo 32,632,268 net tons and through the Canadian canal only 4,146,470 net tons. Practically all the large carriers with grain, iron ore, flour and wheat passed through the United States canals.

In 1910 when the water in lake Huron reached a minimum of 579·51 during the season of navigation and had a mean level of only 580·15 the Canadian canal with its three inches more water carried the bulk of the heavy freight east and passed nearly all the large carriers, the figures being Canadian canal 31,531,036 tons, and United States canals 15,602,673 tons.

That is to say, that, with plenty water, (19·89 feet to 20·78 feet in the Poe lock), the Canadian lock passed only

11·3 per cent of the freight, but, with low water (18·08 to 18·73 feet in the same lock) the extra three inches in the Canadian lock increased these figures to 67 per cent.

Under the present rapid development of our country, the question of improving our waterways and harbours and providing adequate transportation facilities, it a most vital one. Our main transportation problems are along an east-and-west line, with the distances very great. Cheap rates of transportation are a necessity for interchange of products at fair prices between the East and the West, and nothing helps more to provide this result than the improvement of our natural water transportation routes and supplying adequate depths in our channels and harbours.

Acting upon the assumption that all channels connecting the lakes were to have a depth of 20 feet at extreme low water and that our canals were to have 14 feet over their sills the vessel owners and the naval architects on both sides of the line set themselves to the problem of evolving the most economical freight carrier under these conditions, and they can, with truth, say they have given us the cheapest transportation system in the world. This was all done on the assurance of the governments that such would be the case, provided only that nature did not upset calculations by allowing the water to recede beyond anything ever observed.

If now the Government allows this Sanitary District to step in and take six to seven inches off the depth intended, these vessels are no longer what they were designed for, that is to say they carry a far less load than is economical and at the same expense, because each inch in draft mean from 25 to 110 tons freight. If this new condition is to remain constant a new style of vessel must be designed and the old relegated to the scrap heap, as virtually happened the carrier of five years ago. Or if the depths are to be restored they will labour under a disadvantage for many years probably the balance of their lifetime. Knowing the extent of the lake commerce one can easily see the huge loss to the vessel owner and eventually to the consumer of the freight.

In the grain carrying trade of Canada there are 70 vessels, 61 of which are what is called Welland Canal size, and 9 larger.

Every inch of draft means a difference of 22 tons in carrying capacity in the canal sized vessel and the others average 53 tons, so that every trip means a loss of 1,342 tons per inch for the Canal fleet and 477 tons for the larger vessels.

During the season the Canal vessels will make twelve trips or total loss per inch draft of 16,104 tons, or for 7½ inches less water 120,780 tons at $2 per ton, $241,560. During the season the other nine vessels trading to Georgian bay and lake Erie will make 28 trips, or a total loss of 13,356 tons per inch, or 100,170 tons for 7½ inches at 40 cents per ton, this represents a loss of $40,068, or a total loss per annum of $281,628 to the lake freighters in freight charges alone.

This loss will not be borne by the vessel owners so that freight rates will be raised and the consumer be compelled to pay. In addition to these losses, much Canadian freight, coal and grain is hauled in United States vessels and of this we have no record, but the quantity is not small.

The Canadian grain carrying fleet can in one trip transport 8,000,000 bushels of wheat.

Every inch means 60,000 bushels, 7½ inches, 450,000 per trip. For 23 trips to Georgian bay or lake Erie 10,350,000 bushels or more than the capacity of the full fleet for one trip.

This is a matter which concerns not only the shipping interests, but, indeed, the welfare of the whole Dominion. Our trade is developing so rapidly that we cannot cope with the demands for necessary and immediate improvements in our rivers and harbours. At the present moment, when this country is compelled to make enormous expenditures to meet the exigencies of increasing trade by giving transportation facilities, why should existing conditions be rendered more difficult for the Dominion, to benefit a city that could have solved its problems of water supply and sewage disposal by some other methods, than by diverting a large volume of water, which is bound to affect detrimentally the most important internal system of navigation in the world.

To grant the requested diversion is a retrograde step in the development of our transportation system on the Great Lakes, when it is necessary that all energies should be directed towards the advancement and furtherance of the movement for improvement in transportation facilities.

The damage accomplished by the lowering of the lakes all St. Lawrence levels cannot be computed and shown simply by the loss of carrying capacity in tonnage for vessels. There is more to consider; the loss to the public at large in delaying cheaper rates; the loss to the country in rendering all harbour and channel improvements more costly and retarding their completion.

Mr. Hering in his report dated 15th October, 1907, page 35, to the President of the Sanitary District says that if the lowering of the lakes amounts to 6 to 8½ inches on a diversion of 14,000 c.f.s. the prohibition of that amount would certainly be in the interest of Chicago no less than of the entire lake region. We have shown that near the low water stages the lowering is from 4½ to 7½ inches for a 10,000 c.f.s. diversion, and surely if such a strong advocate of the Drainage canal would stop diversion for a lowering of 6 to 8½ inches, less enthusiastic persons are justified in asking for that treatment when the lowering is 4½ to 7½ inches.

Mr. Hering in the same report, same page, suggests a remedy in the shape of converting lake Superior into a storage reservoir. The question of lake Superior storage was taken up by the International Waterways Commission in connection with its report on the Regulation of lake Erie (see pp. 76-81) and the conclusion reached was that "the use of lake Superior as a storage reservoir cannot be successful if navigation is to be maintained unimpaired on lake Superior and the St. Mary river".

A dam and controlling works at the outlet of lake Erie have been suggested to regulate the level of lake Erie and incidentally raise the low-water level. A careful study of this proposal by the International Waterways Commission has shown that it is not feasible.

All compensation schemes are fraught with great difficulties both physical and international. No dams or weirs can be constructed in the boundary waters without the sanction of both countries.

Many shoals and reefs that are just dangerous will become very much so by having less water upon them and extending further into navigable channels. As it is not usual to remove these, extra buoys must be placed.

As government harbours, wharves and piers are affected injuriously, so private parties, not very well able to afford dredging will be compelled to shoulder their losses. True they can by treaty enter action in the United States courts and claim damages, but no private citizen can or will ever avail himself of this right unless his loss be very great.

With the fall of the water to a new datum mark below that on which all harbour works have been constructed, many crib foundations that carry concrete superstructures will have their upper timber exposed for long periods and rot will set in to the injury of the concrete. This is a damage that cannot be easily estimated and none has been allowed.

The diversion of 10,000 c.f.s. is used to create 56,000 horse power at Lockport and Joliet, but the same quantity of water used for power by the St. Lawrence route would give nearly 300,000 h. p.

As the final diversion for the dilution method of sewage disposal rested upon the question of comparison of cost to the people of Chicago of it and other feasible methods, it would appear that outside communities and interests were neglected. Had the citizens of Chicago been told that they must restore conditions in Canada at a cost of $18,937,000, and in other lake harbours at fully the same cost, they would have learned that the dilution method would prove by long odds the most expensive.

This diversion is a matter of great importance to Canada on account of her peculiar make up. A vast area of wheat producing territory separated from the manufacturing section by a long extent of non-productive wilderness. West of the Great Lakes district is her vast undeveloped grain producing area, only a small fraction of which has yet been touched. For many years the bulk of its produce must be exported and for such freight the bulk freighter is at once the cheapest, most convenient and best. Canada is now completing her third transcontinental railway but all the world knows land transport cannot cope with such a system as nature has offered in the Great Lakes and the St. Lawrence. Canada contemplates vast expenditures in the near future in her Welland, St. Lawrence and Ottawa river canals to enable her to take better advantage of her great inheritance and it would be both criminal and suicidal to throw away what nature has thus provided.

This question of diversion is a dangerous one to play with; it will not down with this application. Chicago will not be satisfied now and there is little reason why the next request for diversion should not come from some community to divert directly from Boundary waters with as great injury to navigation as this will be. If one community be granted such great privileges, it will be most difficult to refuse others.

Whereas the application of the Sanitary District states "that it has for some time been engaged in investigating methods and devising plans for the treatment of the sewage with a view to requiring less water for its safe dilution in the future. The methods of other states and countries for such treatment of sewage are not as yet entirely satisfactory to all concerned and any changes of methods for large cities must necessarily require several years". And Mr. Williams, counsel for the Sanitary District, in his argument at the hearing on the 28th of February last, discussed the case from this standpoint.

In answer to this branch of the case the following statement is prepared by Mr. John Kennedy, Montreal, assisted by Mr. R. S. Lea, and Prof. T. A. Starkey, M.D., and submitted:

In the present application what is asked is "Permission for the Sanitary District of Chicago to withdraw from lake Michigan through the Chicago river and Calumet river—not to exceed 10,000 cu. ft. of water per second." It would be physically impossible to withdraw the desired water from lake Michigan without first stopping and otherwise disposing of the natural flow of these rivers and reversing their flow to such extent as to draw inward from lake Michigan the 10,000 cu. ft. per second asked for, and the effect of so doing would therefore be the abstraction from the water supply of lake Michigan all the natural flow of the rivers in addition to the 10.000 cu. ft. of lake water which it is desired to draw inland. The estimated average natural flow of the Calumet river into the lake is about 800 ft. per second, and that of the Chicago river is about 300 cu. ft. per second, which, added to the 10,000 ft. of fresh water it is desired to withdraw from the Lake, makes a quantity of 11,000 cu. ft. per second of the water supply of lake Michigan, which would be directly and indirectly abstracted from it, and turned into the Chicago Drainage canal and thence into the Mississippi. The effect of the abstraction of this quantity upon the level of lake Michigan, of lake Huron and of Georgian bay to which it is joined would be to permanently lower their surface about seven inches. *

It is, therefore, to be clearly understood that the granting of the request of the applicants as it stands would allow both the drawing of 10,000 second feet of water directly

---

*Joint Report on Chicago Drainage Canal, International Waterways Commission, January 4th, 1907.

from the Lake and diverting from its ordinary supply the flow from the Calumet and Chicago rivers making in all about 11,000 ft. per second, will most seriously damage navigation.

The application states that the flow from lake Michigan as permitted by the Secretary of War is limited to 4,167 cu. ft. per second. In the report on the Sewage Disposal of the Sanitary District by Mr. George M. Wisner, October 12th, 1911, it is stated that the average flow during June, July and August 1911, was 7,065 cu. ft. per second. The application further states that the present population whose sewage is to be disposed of exceeds 2,500,000 persons and is rapidly increasing and that the only method at present available for disposing of the sewage of this population is by diluting the same with water withdrawn from lake Michigan and flowing through the Chicago Drainage canal. It is further added that at least 1,000 cu. ft. per second is required to dilute the sewage of 300,000 people in this way and hence it is alleged that the quantity at present permitted to be withdrawn is insufficient.

The statement that dilution is the only method at present available must be understood to mean that Chicago has not so far adopted any other method, and not that no other method could have been adopted or has been made available. The fact is that Chicago has taken no measures whatever so far to purify its sewage, although methods of sewage purification have been studied and brought into successful use in a great many cities in Europe and also in America during the last thirty or forty years.

For example, the city of London, (dealing with sewage of 6,000,000 people) before discharging its sewage into the river Thames, removes the sludge or suspended matter by chemical precipitation, the sludge being then carried to sea in tank steamers.

In Manchester, England, the sewage of a population of about 600,000 people is first treated and then turned into the Manchester Ship canal, not only without causing any nuisance, but actually improving the canal water as supplied by its feeder, the Irwell river. These works have been in operation since the year 1900, or about the time of the opening of the Chicago Drainage canal. The method of purification employed there is by septic tanks and contact beds and is referred to in the report of Mr. Wisner (p. 26) as one of the methods considered for the purification of certain portions of some of the outlying districts of Chicago.

In Birmingham, England, the sewage of a population of practically 1,000,000 people is purified by tank treatment and sprinkling filters and is then discharged into a stream whose ordinary flow is only about 45 cu. ft. per second, or considerably less than the volume of the purified sewage. Dozens of other cities in England similarly discharge their treated sewage into comparatively small streams.

In the Emscher district, in Germany, with a population of about 2,000,000, the sewage is being purified and turned into a stream whose natural flow is from 200 to 300 cu. ft. per second.

In America, the city of Columbus, Ohio, with a population of about 175,000 people, purifies its sewage by tank treatment and sprinkling filters. The effluent is then discharged into the Scioto river, whose average flow varies from 30 to 50 cu. ft. per second. This dilution for the present population is much greater than that at Birmingham, but still amounts to less than ½ cu. ft. per second per thousand of population.

The city of Baltimore, Maryland, with a population of over 700,000, has installed a plant consisting of tanks and sprinkling filters for the purification of its sewage. It is proposed to further treat the effluent from this plant, already inoffensive and nonputrescent, by filtration through sand or by chloride of lime, for the purpose of removing or destroying the germs, so as to protect the oyster beds down the river

Toronto, with a population of 450,000, not only purifies its sewage by sedimentation, but, in addition, filters its whole water supply.

It is to be noted that in all these cases of proper sewage purification the quantity of water for diluting the final effluents is quite insignificant.

Elaborate series of experiments and investigations have been made during the last twenty or thirty years or longer. Notable among these are the experiments of the Massachusetts State Board of Health, which have been carried on continuously at the Experimental Station at Lawrence since 1887; the Manchester experiments (1896 to 1899), experiments at London, Birmingham, Leeds, and several other places in England; experiments carried out by Dr. Calmette at Lille, France, and by Dr. Dunbar, in Germany, and upon the results of these experiments a great many plants have been built and are successfully operating in practice, so that the subject of purification of sewage is far beyond the experimental stage.

These references prove that methods for dealing with sewage are available, and have been available for the last fifteen or twenty years, which are not only superior in every way to the dilution method, but are undoubtedly better for the preservation of health, which is the point urged in the application.

Mr. Hering in his report to the International Waterways Commission (December 15, 1905, p. 228) comes to the following conclusions as regards the comparison between purification and dilution methods:

"3. The extension of the dilution method to the outlying territory is not the only way of preserving the lives and health of the people of Chicago.

"4. For the Calumet area, as well as other districts, there are several methods for the disposal of sewage as effective as the present method of dilution in preventing the pollution of the lake waters."

Mr. Hering, in a subsequent report on the Sewerage of the Calumet District, addressed to the President of the Sanitary District (October 15, 1907, pp. 32-3), in discussing the question of choice as between the purification and dilution methods, expresses an opinion that the choice is largely governed by the question of the annual cost as represented by a balance between expenses and receipts, and that the dilution method for a population up to about 1,000,000 is the cheapest only because it admits of disposing of water-powers created by the water used for dilution (4,000 cu. ft. per second) which he estimates at 22,500 horse-power.

It should be here noted that the basing of choice of methods as between dilution and purification on the returns yielded by the development of water-power, is wholly unjustifiable; because it is based on the taking of water from lake Michigan to the damage of fast navigation and other interests throughout the whole extent of the Great Lakes, their connecting rivers, and the St. Lawrence, and a great lessening of the power which may be developed on the Niagara and on the St. Lawrence rivers.

Mr. Wisner, Chief Engineer of the Sanitary District, in his report of October 12, 1911, which report is indorsed by Mr. Elicott, Electrical Engineer, and by Messrs. C. D. Hill, W. A. Evans and Martin C. Schwab, members of a commission appointed by the Trustees of the Sanitary District, has arrived at practically the same conclusion as to the efficiency of the purification by tanks and sprinkling filters. He says in substance, as regards the Calumet District that even for the dilution method, tank treatment for the elimination of solid matter will be necessary and that at a later date it will be necessary to instal sprinkling filters or other treatment in connection with the settling tanks, and goes on to indicate sites suitable for the installation of the purification plants.

A similar method of treatment is recommended for the 39th Street pumping station, the North branch and other districts, that is, the installation of sedimentation tanks followed later by sprinkling filters.

All the cases cited, many more which could be cited, and the above quoted opinions of the engineers of the Sanitary District go to prove that it is not necessary to withdraw water from lake Michigan and to dispose of the sewage of either the city of Chicago or the outlying districts by the dilution method, but that methods of purification of sewage are not only feasible but are adopted with satisfactory results to the lives and health of other communities and can also be adopted with the same results for Chicago and its outlying districts; and that not only would this have the effect of ridding lake Michigan of much pollution but it would rid the Illinois and Mississippi rivers of the large quantities of sewage, diluted though it be, which the present method of dilution pours into them. It is to be noted also that the experience of other cities, notably the experience of Manchester with the Manchester Ship canal, shows conclusively that the natural discharge of the Chicago river plus say 1,000 second feet drawn from lake Michigan for navigation purposes, would be amply sufficient to carry away through the Drainage canal the purified effluents of Chicago and the whole Sanitary District.

Although not stated in the application, it is obvious that the desired 10,000 second feet of water is intended to be used to assist in conserving life and health by making it possible to discharge the untreated sewage of two and a half millions of the people of the Sanitary District into the Illinois river instead of into lake Michigan and thus endeavor to prevent the lake water being made unfit for domestic use, but the fact is that the lake water in the vicinity of Chicago is tainted and unwholesome whether the sewage be kept out or not. Chicago is at the stagnant end of what is practically a stagnant lake, fed only by small streams, nearly of all of which discharge into the sewage of a large and rapidly increasing population and the drainage wastes of large and growing industrial establishments. The lake is further polluted by the sewage discharged by trading and passenger steamers which everywhere traverse its waters and throng its ports and which are especially numerous at Chicago. The effect of drawing so great a quantity of water as 10,000 second feet from the lake at Chicago is therefore to draw toward the waterworks intakes the worst water of the lake and to that extent not to conserve but to injure the health of its people.

Milwaukee, on the side of the lake and, therefore, in a better situation than Chicago for obtaining wholesome water from it, has found it necessary to adopt measures both for treating its sewage and filtering its water supply.

Lake Ontario is not a stagnant lake but has the Niagara flowing through it and a less dense surrounding population than has lake Michigan, yet, is so impure that the city of Toronto has deemed it wise for the preservation of health to instal a large and modern filtration plant for its water supply and a sewage purification plant in addition.

Montreal, which takes its water supply from the river St. Lawrence—the outlet of Lake Ontario—and is situated at the foot of a series of great rapids which tend to purify the water, is also installing a great filtration plant to purify its supply. A neighbouring waterworks system which serves nearly all the suburban towns, is doing the same.

Cleveland, on lake Erie which has the Detroit river flowing through it, is understood to have also determined upon the installation of a waterworks filtration plant.

Chicago, because of its peculiar position and its vastly greater land and floating population is in far greater need of a waterworks filtration plant in order to obtain pure water and thus really conserve the life and health of its people. With such plant installed and any modern system of sewage purification adopted, there would be no need for drawing such large quantities from the lake as to be detrimental to the navigation interests and to the whole chain of the Great Lakes and their outlet rivers.

The application states that the Sanitary District has been engaged for some time in investigating methods and devising plans for the treatment of the sewage with a view to requiring less water for its safe dilution in future, and goes on to say that, until these experiments are concluded and proper works installed, the use of additional water from lake Michigan is essential to the health of the large population of the city of Chicago and the Sanitary District. Mr. Williams, in pleading, says, that these experiments have already been carried on for two and a half years at a cost of $100,000, which is equal to an average cost of $40,000 per annum. Mr. Hering, in his report of 1907, states that the desired 10,000 cu. ft. per second discharged through the Drainage canal will produce at Lockport, 20,000 horse-power, and at Joliet, 27,300 horse-power, which, at an estimated value of $25 per horse-power, will produce an annual revenue of $1,407,500. Obviously, it will be very profitable to continue the experimental station indefinitely, because the annual returns from the sale of power will overbalance the annual cost of continuing investigations at the experimental station by $1,367,500; and, under such conditions, it cannot be expected that Chicago will be in any great haste to cease investigations and adopt one or more, of the well known methods of sewage purification and, thereby, deprive itself of the plea of necessity for drawing the water from lake Michigan, which yields such enormous profits in the selling of power.

The effect of drawing the quantity of water already drawn from lake Michigan, and passing it through the Chicago river and Drainage canal, was shown at the hearing of the 28th of February, 1912, before the Secretary of War, to be decidedly detrimental to the use of the Chicago river as a navigation channel and harbour basin, by reason of the strength of the current which is created, and the passing of 10,000 second feet, for which permission is now asked, would be greatly more so. The increase in the quantity of water passed through the river will increase the velocity of the current in direct ratio, but increase of velocity increases its dynamic force, that is, its damaging power in the handling of vessels, as *the square of the velocity*. The quantity of water which may be drawn from the lake under the existing permission of the Secretary of War, is 4,167 second-feet, but the actual quantity, according to Mr. Wisner's report (diagram p. 6) is about 7,000 second-feet, the actual effect is to increase its damaging forces 2·8 times and the effect of passing 10,000 second-feet would increase its force 5·75 times. Similar effects are, and would be, produced in the Drainage canal. The 4,167 second-feet which may be drawn from the lake under the existing permission, plus 300 second-feet the intercepted average natural discharge of the Chicago river, and, say, 1,100 second-feet pumped by the Chicago waterworks for city use makes a total discharge through the Drainage canal of 5,567 second feet. This, in the rock section of the canal having a cross section of waterway of 161′ x 22′ makes a current of about a mile an hour which is quite safe for navigation but, if the draft through the Chicago river be increased to 10,000 second feet plus the 300 second-feet from the Chicago river and 1,100 second-feet of waterworks pumpage the current would be raised to about 2·15 miles an hour and its strength increased over 4½ times, which would be dangerous.

It is urged, therefore, in view of the foregoing facts and considerations, that the application for permission for the Sanitary District of Chicago to withdraw from lake Michigan through the Chicago and Calumet rivers—not to exceed 10,000 cubic feet of water per second—be not granted.

Respectfully submitted,

Daniel Mullin, K.C., Counsel.
John Kennedy, Consulting Engineer.
A. St. Laurent, Assistant Deputy Minister Public Works of Canada.
Wm. J. Stewart, Chief Hydrographer.
V. W. Forneret, Superintending Engineer, St. Lawrence Ship Channel.

Representing the Government of Canada

PROTEST OF THE COMMISSION ON CONSERVATION, CANADA

SECRETARY STIMSON: According to the memorandum you have given me, Mr. White will be heard next.

Mr. James White, Secretary, Commission of Conservation, Canada, read the following memorial:

SIR,—I have the honour to present herewith the views of the Executive Committee of the Commission of Conservation, Canada, in regard to the application of the Board of Trustees of the Sanitary District of Chicago now before you.

The subject has been considered by the following members of the Executive Committee:

Hon. W. C. Edwards.
Sir Edmund B. Osler.
Hon. H. S. Béland.
Dr. J. W. Robertson.
Dr. C. C. Jones.
Mr. J. F. Mackay.

The views therein expressed are the unanimous opinions of the Committee.

The proceeding is understood to relate to the application of the Board of Trustees of the Sanitary District of Chicago, for a permit to increase the diversion of water through the Chicago Sanitary canal from 4,167 cubic feet per second to 10,000 cubic feet per second.

(1) In support of the application it is urged that the increased quantity of water is necessary to prevent the

sewage of the Chicago Sanitary District affecting the water of the Desplaines and Illinois rivers to such an extent as to be a menace to the health of the inhabitants of the territory traversed by these streams. The charter of the Sanitary District provides that a dilution of 333⅓ cubic feet per second shall be provided for every 100,000 inhabitants of the District, which is double the dilution that the British Rivers Pollution Commission consider necessary.

During the trial of the suit of the State of Missouri against the State of Illinois and the Sanitary District of Chicago much expert evidence was adduced to cast doubt upon the efficiency of dilution by running streams. Be this as it may, it is unquestionable that the city of Chicago cannot reasonably expect that, with the wonderful growth of her population, she shall be allowed to make additional diversions to conform to the requirements of the Drainage Act, regardless of all the important interests affected thereby.

It is urged, therefore, that no additional diversion be permitted, but that the city of Chicago be compelled to purify its sewage to such an extent that, with the increase of population, the effluent will still comply with the best standards of sewage dilution. If based on the standard established by the charter of the Sanitary District, the present permitted flow of 4,167 cubic feet per second would meet the requirements of the law for a population of 1,389,000. It is obvious that, with a bacterial reduction of one-half, this flow would suffice for a population of 2,778,000 or about 600,000 more than the present population (2,185,283) and would, therefore, suffice till about 1918. A bacterial reduction of two-thirds would suffice for 4,157,000 people—the estimated population in 1941.

(2) To proposals that Chicago treat her sewage, it has been objected that there "is no system of sewage purification now in practical use which can be relied upon to turn sewage into drinking water." To this, it is a sufficient reply to say that, it is not proposed "to turn sewage into drinking water". All that is urged is that the effluent be partially treated and sterilized sufficiently to prevent the bacterial content of the Illinois and Desplaines rivers rising above the best sanitary standards. To the objection that this does not comply with the strict wording of the Sanitary District charter, it is a sufficient answer that it complies with the spirit of it; that, lacking a permit from the Secretary of War, it would not be possible to secure the increased flow proportional to the increase of population; that the result aimed at in inserting this clause in the charter had been attained and that the clause must be interpreted in the light of reason.

(3) Respecting manufacturing wastes, the Committee on Engineering, on May 11, 1910, reported that manufacturers in the southern portion of the city and adjacent territory are allowed, unchecked, to discharge through the Calumet river into lake Michigan, industrial wastes that endanger the water supply of Chicago. Nowhere, however, is there any intimation that Chicago has taken, or intends to take, any legal action to prevent the discharge of these wastes, some of which are stated by the Committee to be "*highly favourable to the growth of bacteria.*"

(4) Up to December, 31, 1908, the Trustees of the Sanitary District had expended $60,147,883 and, to date, have expended 62 million dollars. Had they adopted a channel of a more moderate size, they would have effected a very considerable economy, and, had the money thus saved, been

expended on sewage sterilization works, the city of Chicago would not now be applying for a permit for the diversion of an additional amount of water.

(5) It has been urged that the question at issue is: which has the more just claim upon the waters of the Great Lakes, the Sanitary District of Chicago or the other users of the waters? So far as Chicago's water-supply is concerned, if contaminated, it is polluted by the residents of the city and vicinity, and it is incumbent upon these residents to prevent this contamination and to purify their water-supply by some system of filtration.

The great city of London, with a population of seven and one-third millions, filters its water-supply and treats its sewage, but Chicago urges that it is impossible for her to do either. Her extravagance is put forward as an excuse for a diversion that injuriously affects the water-line on four thousand miles of shore—an action that injuriously affects a multitude of interests in two nations, and that injuriously affects the riparian rights in a vast territory.

(6) If imposing upon Chicago filtration of her water-supply and sterilization of her sewage results in checking or reducing the present extravagant use of water and, if it results in preventing the present unchecked discharge of wastes from stock yards, glucose factories, etc., refusing her application for an increased diversion of water will prove a blessing in disguise.

(7) Though a permit has only been granted for a diversion of 4,167 cubic feet per second, the Special Board of U. S. Engineers, of which Gen. W. H. Bixby was Chairman, in its report to Congress on January 23, 1911, stated that:

"The War Department, while awaiting the definite action of Congress, has, so far, permitted the diversion of

4,167 second-feet and the Sanitary District is understood to be using 7,000 second-feet."

Evidently therefore, the Sanitary District is, without any permit or authority whatsoever, diverting 3,000 second-feet in excess of the authorized amount.

(8) In terms of comparison, the Sanitary District is, at present, diverting from the St. Lawrence system an amount equal to the extreme low-water flow of the Ottawa river at the city of Ottawa, where it carries the drainage of 34,600 square miles of territory. It is proposed to divert, in a few years, one and one-half times this flow and the Sanitary Canal has been constructed to carry an amount equal to *double* the low-water flow of this, the greatest tributary of the mighty St. Lawrence.

(9). Respecting the contention that the diversion will be required for purposes of navigation, the United States Special Board of Engineers has stated that "for purposes of navigation a diversion from lake Michigan of less than 1,000 second-feet of water is all that will be necessary"; and, again, that " the claim that more than 1,000 cubic feet per second is required for purposes of navigation can not be maintained."

(10) Many estimates of the fall in levels of the Great Lakes caused by the diversion at Chicago, have been made. The accompanying profiles show the levels of the Great Lakes from 1860 to 1911.

The loss of level due to the abstraction of 7,000 second-feet is coloured blue* and the periods during the season of navigation 1860-1911, when the water was below the mean level for the forty-year period, 1860-99, have been coloured in red.† This indicates diagramatically what is disclosed by a study of the gauge readings, viz., that since 1890, less water has been flowing down the St. Lawrence to the sea than during the thirty years preceding that date. While part of this deficiency is due to the clearing of the forests, draining of swamps and other operations incident to the development of the country, it is undeniable that a part of it is due to the Chicago Drainage canal. The net result is: that, while navigation is handicapped by the unavoidable loss of margin due to what may be called "development operations", the situation is further aggravated by the decrease due to the Chicago diversion.

---

* Black on diagram as reproduced.

The International Waterways Commission estimated that the amounts by which the *mean level* of the Great Lakes, as derived by observations from 1860-1907, would be lowered by the diversion of 10,000 cubic feet per second are as follows:

WATER LEVEL LOWERED BY DIVERSION AT CHICAGO

—	7,000 cu. ft. per sec.	10,000 cu. ft. per sec.	14,000 cu. ft. per sec.
	Inches	Inches	Inches
Lake Huron-Michigan	4¼	6¼	8½
Lake Erie	3⅞	5½	7¾
Lake Ontario	3	4¼	6
River St. Lawrence and Rapide Plat	3⅜	4¾	6¾

It is to be noted, however, that these reductions are calculated for *mean water* and *would be increased at low water* thus aggravating the injury to the interests of navigation. Thus, during 1911, the stage of lakes Huron and Michigan was between 579 and 580, at which stage, the levels were lowered 5¼ inches by the diversion of 7,000 cubic feet per second at Chicago. A diversion of 10,000 second-feet would have lowered them 7¼ inches and 14,000 second-feet would have lowered them 10½ inches. As the average annual range of these lakes is 1·21 feet, it is apparent that even the present diversion is affecting their levels to the extent of 35 per cent of the annual range. It is contended that such diversion is in contravention of Article III of the Boundary Waters treaty of 1909, which forbids the construction of works that "materially" affect the levels of International Boundary waters.

---

† Omitted in printed diagram.

(11) Respecting the contention that the changes in level caused by the Drainage Canal diversion do not concern shippers, and that, at most, the effects would be trifling, the U.S. Board of Engineers in reporting on this subject said:

"If one watched carefully the course pursued by shippers one would see that, as a rule, each vessel carries all that it can take and get out of its port, or into that it intends to reach. Vessel owners and managers are very shrewd, watchful men; they know what they can safely carry, allowing for storms and short detentions arising from passing causes; they average pretty well the practical depths, and *carry all the channels will stand* .. .. Should it be certain that these average depths were reduced three inches, or six inches, they must load accordingly and, not only the large boats, but also the small ones using the small harbours that the large ones cannot go into—all must lose the three or six inches as it may be; and, not for one or more trips, but for all trips and for all time; a diminution of capacity is not a single tax but a continuous one."

The Board estimate that a loss of draught of three inches will decrease the cargo-capacity of a vessel of 20 feet draught by 3 per cent, and of a vessel of 12 feet draught by 4 per cent. With a loss of draught of six inches, the capacity would be reduced by 6 per cent and 8 per cent respectively.

The Government of Canada has, at enormous cost, completed a waterway for vessels of 14 feet draught, at low water, from Fort William to Montreal, and, for vessels of 30 feet draught, from Montreal to the sea. Every inch abstracted from the available depth represents a loss of cargo capacity and a loss of income which is aggravated during low-water years like 1911.

In view of the foregoing, it cannot be seriously contended that the effects of the diversion are of little importance.

(12) The engineers of the Sanitary District have never concealed their intention to develop the full amount of water-power possible and to utilize the full capacity of the Sanitary canal, viz., 14,000 second-feet. Mr. L. E. Cooley, late Chief Engineer of the Sanitary District, has declared that it was his "hope and intention" to excavate a channel with a capacity of 16,667 cubic feet per second.

Mr. Cooley has also stated that: "It is estimated that the flow of water that will eventually come from lake Michigan through the Chicago Drainage canal, together with the natural flow of the river, will produce 173,000 horse-power, and, with the revenue therefrom, the State of Illinois proposes, eventually, to recoup itself for its expenditures and contribution to the deep waterway."

Every cubic foot of water abstracted at Chicago reduces the water-power that could be generated at Niagara Falls and in the rapids of the St. Lawrence, thus injuring the provinces of Ontario and Quebec and the state of New York, and owners of power on these rivers. In addition, the development of power on the Desplaines and Illinois rivers represents a great economic waste. Water used at Lockport, Ill., under a 34-feet head, has only one-fifth to one-seventh the efficiency obtainable at Niagara, to say nothing of the other power sites on the St. Lawrence. The electrical art is practically in its infancy and, with its development, the value to the community of great water powers will be enormously increased. No alienation of this valuable asset should be permitted.

The use of waters belonging essentially to International Boundary waters, entirely diverted from their natural channels, for the purposes of water-power development, is a use that can not justly be sanctioned.

(13) It has been proposed that the Chicago Sanitary District erect compensation works. While the treaty of 1909 provides for works of this character, nevertheless, it is not the intent of the treaty to permit water diversions on the plea that compensation works may, or will, be built. Such works should only be a possible remedy to be applied in extreme and absolutely unavoidable cases. Clearly, neither the United States, nor Canada, could ever conserve the integrity of the levels of the Great Lakes by allowing to be instituted, so to speak, a policy of "diversion and compensation." Finally, no compensation works could compensate Canada for the injury done to her interests in the river St. Lawrence by the abstraction of water at Chicago.

(14) It is further contended that this diversion is in contravention of international law. Thus, Oppenheim, in his "International Law," I, 175, says:

"Just like independence, territorial supremacy does not give a boundless liberty of action. Thus, by customary International law a State is, in spite of its territorial supremacy, not allowed to alter the natural conditions of its own territory to the disadvantage of the natural conditions of the territory of a neighbouring State—for instance, to stop or to divert the flow of a river which runs from its own into neighbouring territory."

(15) The Ashburton treaty, 1842, provides that certain channels in the Detroit, St. Clair, and St. Lawrence rivers "shall be equally free and open to the ships, vessels and boats of both parties." It is contended that any action, such as the Chicago diversion, is in contravention of the treaty inasmuch as it tends to destroy the navigable capacity of these channels.

For the above reasons, the Executive of the Commission of Conservation expresses the opinion that the application is without even the semblance of necessity, and desires to place on record its unqualified opposition to the proposition which is before you.

I have the honour to be

Sir

H. S. Béland

For Chairman

ARGUMENT OF FRANCIS KING, ESQ., REPRESENTING THE DOMINION MARINE ASSOCIATION

MR. KING: Mr. Secretary: I would say, in the first place, that I appear under instructions from what is called the Dominion Marine Association, an association of vessel owners which comprises in its membership practically all the registered tonnage from the head of the lakes down to Montreal doing business under Canadian or British registry. So that what I have to say is practically comprehensive with reference to Canadians interested in navigation on the Canadian side of the line.

While my brief pertains to these matters and it would be, very naturally, confined to a consideration of the navigation question, I would like to say, at the same time, that we ask permission to support and take advantage of every argument of every other kind that is adduced, and I would be very much tempted to explore the ramifications of two or three of those arguments except that time prevents because of your Honour's suggestion that you will be quite satisfied to consider, and that your proper function is really to consider, the question of the effect upon navigation. I will therefore confine myself entirely to that question.

Let me say, in dealing with that subject, that I have the greatest diffidence, not because of any doubt of accuracy of anything I have to say, or because of any doubt of my right to stand here to-day—because your kind invitation has set me right on that point—but I feel that I am addressing a court which, in itself and through its officers, possesses infinitely greater knowledge on the subject than I have at the moment, myself.

The United States of America have developed to such a wonderful extent their system of their improvement of the great chain of the Great Lakes and waterways and have developed to a corresponding degree the system of records of the improvements and of the needs of interests upon those lakes; this has gone to such a great extent, that I feel that the volume of information before me at this moment is much greater than there is in my own brief; but, at the same time, coming from a far country as I do, I want to say something, and I really feel that I would satisfy the needs of the case best if, in answer to your invitation, I would say Canada has a very substantial fleet, a fleet which has in the past decade, practically increased its tonnage ten-fold. Whereas, about ten years ago, the carrying capacity of that fleet afloat at one time was only about 800,000 bushels of wheat, at the present time it will easily accommodate, afloat at one time, 8,000,000 bushels of wheat. It is almost enough to say that. We have only to add to that, the suggestion that our fleet is a deep-draught fleet to a certain extent, and the tonnage that is now being built, and will be built and, with an improved Welland canal, will be deep-draught tonnage, and, then, to add that there are barriers in the great chain of lakes and waterways which affect us just as much as they affect the navigation interests of your own country, sir, and the case is closed, so far as I am concerned.

On account of the very short time available for a large number of gentlemen who wish to be heard, instead of repeating what has already been said by other gentlemen, I am therefore going to leave a very great deal of it, without repetition, and I will leave a document with you setting out certain tables. But, in order to explain a little more definitely the seriousness of any depreciation of the levels of the lakes, from the Canadian point of view, I want to emphasize one particular point. Speaking on the Canadian side, we wish to guard in every possible way the risks and dangers to navigation which accumulate as the result of those very difficulties.

We had formed, at the close of the year 1910, the Canadian Lake Protective Association, a sister association to the Dominion Marine Association, with the object of decreasing the risks of disaster by supervising navigation in every possible way, controlling the methods that the ships in that Association adopt in the navigation of these waterways, and, by decreasing the risk of disaster, decrease the amount of our losses, and, especially enabling us to make a better showing to marine underwriters, who insure risks down as far as Montreal.

In this connection let me say, to reach Montreal, we pay 8 per cent. on the insurable value of our hulls, and to pay 8 per cent—even before beginning to make running expenses—is a terrific drain.

Our Association is in close touch with the Canadian Government and the different departments of the Government, such as the Department of Marine and Fisheries, and the Wreck Commissioner and other officers, and the navigation is closely supervised at the various points where these natural barriers exist. The first is at the head of the lakes, the Soo canal. Let me say, too, that the Canadian lock at the Soo, is the one that accommodates the deep-draught vessels in rough weather. Last year we had severe penalties imposed, perhaps more so on your side, for carrying through the Soo canal at a draught of one or two inches greater than that recommended by the Superintendent of the Canal.

Every time a change takes place in the level in the Soo canal, a telegram is sent to the officers of this Association and the information is circulated at once, among the various members of the Association in order that the draught of vessels may accommodate itself to the actual depth of water there.

The moment that is said, the argument that Mr. Williams advanced, that a change of a few inches will be lost in the multiplicity of changes on the Lakes, is refuted.

The Welland canal will ordinarily accommodate not more than 14 feet. In periods of low water, it will not do that.

SECRETARY STIMSON: What is the depth of the Soo?

MR. KING: Last year, up-bound, 17 feet and some inches; down-bound, by a process of 'flooding' a vessel out of the lock, we could get them through at 18 feet two inches, or 18 feet four inches. The mere fact that we had to flood them out, is very objectionable and was merely done because it was necessary in order to get them out.

SECRETARY STIMSON: The Soo is not affected at all, of course, by lake Michigan?

MR. KING: Oh, yes, it is. I am glad you called my attention to that point. Detour, at the foot of St. Mary river, is lower in level than the lower level of the Soo. Nevertheless, engineers tell me quite emphatically that that difference in level is so slight—the rapids being above the locks or alongside the locks up there—that the lower sill (of that lock) is affected to the extent of at least seven inches by a diversion at Chicago of 10,000 cubic feet per second. My figures may possibly be wrong, but I have seven inches as against 7·4 for lake Michigan. In other words, the effect is almost identical at the Soo in the number of inches of reduction in level. This is an engineering problem. It is due, I suppose to the lack of resistance at the foot of the slight flow down the St. Mary river, and the water gets away that much more easily if the level of the lake is increased.

We allege the Soo is the substantial barrier, and the Welland canal is another. Carrying it further, to the St. Lawrence, which is absolutely free and open to citizens of both countries under the treaty, we experience a very serious difficulty there. Down-bound vessels make use of the rapids, enter the rapids at the Rapide Plat. Whereas we ought to have 14 feet, last year we carried down at 12 feet six inches, and 12 feet eight inches, and, with the assistance of the Canadian Government, we sent vessels back to the elevators at Prescott to take out so many thousand bushels of their cargo before they attempted to run, and possibly endanger, the safety of their cargo. At Coteau we experience great difficulties, and, at Montreal, of course, when the vessels of larger draught get in there they are hurt even to a larger extent.

These figures are tabulated to a certain limited extent, Mr. Secretary, and, for the purpose of greater simplicity, I have set out in statement "A", attached to my memorandum, the approximate loss in carrying capacity of five steamers of the St. Lawrence and Chicago Steam Navigation Company on one inch draught at minimum load, one of which is 510 feet in length, another 376 feet, another 332 feet, another 260 feet, and the fifth 250 feet. They carried 28 cargoes each in 1911. Their average freight rate per ton was 40 cents. That is a safe, conservative figure, because they carried coal up and came back empty half the time in order to get a cargo. They lost, as a total fleet, for one inch, 185 tons carrying capacity, and, by actual working out of their own marine superintendent.

One hundred and eighty-five, multiplied by eight trips, by 40 cents, freight rate, equals $2,156 per season loss for each inch taken from present depth, or, for six inches, the loss would be $12,936, on the part of that one fleet.

I have tabulated that with reference to the whole fleet, and a further computation has been made with reference to the whole fleet with regard to the grain-carrying capacity. I have mentioned that already and would like to refer to it again.

Whereas we can carry about 8,000,000 bushels afloat at one time—taking that as a basis—and working out a comparison, it is shown that, if we were to take, say, 23 trips in a season, say to the Georgian bay or Buffalo—and I am taking that as an average because a great many go to Montreal—but taking them all on the Upper lakes, assuming that they were all deep draught, it would reduce the carrying capacity in a season by the full carrying capacity afloat at one time.

These matters speak for themselves. I only call attention to them to show the great difficulties we really experience on our side of the line.

Outside of the freight interests, I want to call attention to the passenger interests. On the St. Lawrence, there is one company which at an enormous expense, and through a great many years past, has been developing to the greatest point of perfection a system of navigation which will best serve the interests there. I refer to the Richelieu and Ontario Navigation Company. They have succeeded in finding out which is the best kind of a boat to run down the rapids, a deep draught or a shallow draught boat, a stern-wheeler or a side-wheeler; and, just as they have done that, they have begun to touch bottom in the rapids, in the Cascade rapids and in the Coteau rapids; and so, what is one of the most wonderful systems of passenger navigation,—which, by the way, carries more passengers from this side of the line than from the other side—is practically put out of business to a limited extent. I propose to submit with my documents, a letter written on behalf of that company addressed to you, Mr. Secretary.

Adding to these difficulties, the difficulties experienced after we pass the port of Montreal and get into what we call the St. Lawrence Ship channel, we have a very substantial grievance to suggest to you as the result of the diversion of this water from the Lakes. Mr. Meredith will speak especially for the ocean tonnage below.

Now, then, in the face of this, we submit respectfully, that a local demand at one point, even if for sanitary or domestic purposes—which are suggested by the treaty as taking precedence—ought not to outweigh interests of such enormous importance belonging to both countries and extending throughout the whole waterway down to tidewater.

One more point, that has been developed by Mr. Mullin: the matter of the International Waterways Commission's report. As I read the record of the 28th of February, I see two arguments advanced by Mr. Williams, of importance. One was: we would lose sight of these six inches in the number of fluctuations that would exist, and I do not think there is a great deal in that, but the other is, that a commission has sat on the question and determined it in a certain way.

I read that report through very carefully. I doubted what I would say about it, today, but the subject has come under consideration, and I wish to add my quota of information on the subject. I have read it through in the light of a discussion with reference to the proposal to take more than 10,000 cubic feet per second out of lake Michigan. As it occurs to me, the matter was considered by the Commission in the light of an existing state of facts, that a canal had been built, and 10,000 cubic feet was proposed to be diverted, and they were discussing whether or not, an additional amount should be permitted to be diverted, and I suggest that their former recommendation was that no more than 10,000 cubic feet should be taken out; but 4,000 cubic feet, which was supposed to be taken out by the Calumet river, and which was really under discussion, should not be allowed to be taken out.

Allow me to refer to two or three points in the record which would clearly indicate that view to be the correct one.

If I may go back, first, to page 177 of the Canadian report—

SECRETARY STIMSON: Give us the number of the section.

MR. KING: It is number 19.

In the course of that paragraph it is pointed out that the diversion of 10,000 cubic feet per second from lake Michigan affects other interests adversely; but these interests have withheld their opposition, and I would suggest respectfully that our withholding of any opposition on the part of the marine interests in the Lakes did not amount to a very great deal, because our opportunity to present an opposition was a very extremely limited one.

"The plans calling for that amount have been under public discussion for some years. Although withholding formal approval, the Federal authorities have taken no steps to prevent their execution. Congress has called for a plan and estimates for an improvement of the waterways connecting with it, the scope of which is fixed by that amount. There appears to be a tacit general agreement that Chicago needs, or will need, about 10,000 cubic feet of water per second for sanitary purposes and that the city should have it without further question."

So, as to the existing state of facts, the Commission founds its subsequent work upon what they assume to be a tacit general agreement, to which I respectfully say we certainly were not parties.

Again, in clause 35, they say:

"The amount which it is proposed to divert from the Calumet river, 4,000 cubic feet per second, is fixed by accident rather than design, being the excess which the Chicago Drainage canal is found capable of carrying after providing for the 10,000 cubic feet from the Chicago river, for which it was originally constructed. It is certain that no greater amount than 4,000 cubic feet can be diverted from the Calumet without checking the flow from the Chicago river, and, thus, giving relief to a suburban portion of the city at the expense of the richest and most populous centres."

In the course of clause 38 they instruct that Commission and they say:

"The extension of the system to the Calumet river alone, is in question, and the question is: Are there not other methods of sewage disposal which can be applied here at a cost not exceeding much, if at all, the cost of the method proposed, and which will be equally effective in preventing the pollution of the lake?"

In other words, they were there talking about the 4,000 feet, and, when their recommendation is finally given, they say, in paragraph 43, that they think 10,000 cubic feet per second would look after the needs of the central part of the city of Chicago, and they recommend the Government of the United States to prohibit the diversion of more than those 10,000 cubic feet. They deal with an existing state of facts, and they leave it a matter of recommendation to your Government that no more shall be given.

One more word with reference to the same subject. It was suggested by you, Mr. Secretary, that this report has been acted upon to some extent, and is therefore entitled to consideration, in connection with the uses of water at Niagara Falls.

Secretary Stimson: No; no; I did not suggest that. I said that that proposition was argued.

Mr. King: Exactly; perhaps I should put it that way.

Secretary Stimson: I did not mean to put it out as a suggestion of my own at all.

Mr. King: No, and I do not want to commit you to it.

The fact, that, in considering afterwards the uses of water at Niagara Falls the two nations have apportioned between them the amount of water which shall be taken, does not to my mind constitute a serious obstacle to the consideration of that report of 1907, which was merely a recommendation, because the people of the two countries are interested in navigation to the same extent, or, rather, the people of your country, Mr. Secretary, are interested to a greater extent in navigation than we are, and an adjustment of a matter of that kind in a treaty is one that can be taken up at any time between the United States and Canada. A matter affecting both countries in that way is something that could be taken up, under the treaty, at any time, and adjusted.

SECRETARY STIMSON: I think the real argument in regard to that is that one takes water away from the navigation and the other does not.

MR. KING: Quite true; but even if it were necessary, in order to make a fair adjustment, I think that could be arrived at at any time in the future, by negotiations between the two countries.

Just one other point. The matter was really one that ought to go, under the spirit, if not the letter, of the present treaty, to the International Waterways Commission, the International Joint Commission of the two nations. I do not wish to press that point because you have confined the question to the question you have laid before us. But, if the question took a broader aspect, if the question of sanitary purposes should be considered, the question of whether or not, this is the right way of taking the sewage out of Chicago, or, if in any other way the question is broadened, then I respectfully suggest that we endorse the suggestion made by Mr. Mullin, that, by completing our argument now, we do not want to be cut out from advancing our views if necessary before another tribunal.

SECRETARY STIMSON: There is no danger of that. My own jurisdiction, as I understand it, is to determine whether or not, the interests of navigation are adversely affected. If I should determine that they are not, my permit would not give any substantial right to these people against any objection made upon another basis, under the treaty, or objections arising in any other way. I mean Canada would not in any way be foreclosed against raising any other right she might have by treaty or otherwise, by my determination, as, under the American statute that gives the Secretary of War the right to determine, before he issues a permit, whether or not navigation is affected. My permit would not in any way affect you.

MR. KING: I understand that point perfectly, and I wish you to understand sir, that we are not in the slightest, raising any objection to the present tribunal. We are well satisfied on that point; but one other thing, and that is, that, if in the consideration of the matter by you or your officers, the idea of compensating works is considered, then it is a matter, we submit, in which the Canadian Government would necessarily, have to join with you in the consideration of the matter because, not only is the St. Lawrence river in its lower reaches, entirely within the Dominion of Canada, but it is one that affects the two countries, and the compensating or remedial works would have to be joined in by both governments, and, we, of course, rest on the assurance that the Canadian Government would join you in considering that question.

One more thing, Mr. Secretary. There has been handed me a resolution adopted by the Kingston Board of Trade.

SECRETARY STIMSON: You may submit that without reading it.

MR. KING: Yes, sir. This is protesting against the diversion of the additional amount of water asked for.

Mr. King submitted the following memorandum of argument on behalf of the Dominion Marine Association, and resolutions adopted by the Kingston Board of Trade:

MEMORANDUM OF ARGUMENT AGAINST THE APPLICATION OF THE CHICAGO SANITARY DISTRICT FOR PERMISSION TO DIVERT 10,000 CUBIC FEET OF WATER PER SECOND FROM LAKE MICHIGAN

Submitted on behalf of the Dominion Marine Association (of Canada) representing all the vessels engaged in Canadian trade between the head of the Great Lakes and the St. Lawrence river.

(1) It is respectfully submitted that the question at issue upon the present application, namely, whether the proposed diversion will prejudice or impair navigation, can only be answered in the affirmative.

(2) The self evident fact that the diversion of water from lake Michigan at Chicago must affect the levels of the other lakes and of the St. Lawrence river is established by ample authority already cited in evidence, and is practically conceded by the applicants. The figures submitted at the present hearing on behalf of the Canadian Government (computed with reference to periods of depression)show that, if anything, the loss has heretofore been underestimated. They indicate a lowering of the water at various points as follows:

	For a withdrawal at Chicago of 10,000 cubic feet per second	
Lake Michigan	7.4	inches
Lower sill of lock at Sault Ste. Marie	7.0	"
Lake Huron	7.4	"
Lake Erie	6.1	"
Lake Ontario	4.5	"
Rapide Plat in St. Lawrence River	6.8	"
Cornwall Canal, Lock 21	5.0	"
Coteau	5.4	"
Montreal	10.2	"

(3) The applicants then resort to the suggestion that a loss of even 6 inches need not be considered seriously, inasmuch as navigators have to contend, in any event, with such a variety of heavier fluctuations in level due to conditions beyond present control. Such a suggestion might prevail if the depth of channels, canals and harbours in the waters named exceeded the load draught of the vessels passing through them by a sufficient margin; but the contrary is true, and the fact is, that, at almost innumerable points, the tonnage afloat is restricted in carrying capacity by the question of depth of water available. Vessels are built to utilize every inch of water available over the natural barriers to navigation, and, in periods of low water, as at present, the loss in carrying capacity is enormous. For each inch of this loss actually suffered by each vessel, within the limits of a correct table of losses such as the above, it is submitted that the diversion of water at Chicago must share the responsibility.

(4) The locks at Sault Ste. Marie, the natural barriers between lake Huron and lake Erie now artificially lowered to certain depths, the Welland and St. Lawrence canals, and the various harbours to be entered, are the principal factors in determining a vessel's load draught. In the season of 1911 the depth available in the Canadian lock at Sault Ste. Marie represented the maximum draught available in the upper waters and that was only 17 ft. and some inches for up-bound boats, and 18 ft. and some inches for boats down-bound which could be flooded out of the lock. The Welland canal, ordinarily safe at something over 14 feet, was the subject of special regulations in 1911, draught being cut down materially; while down-bound vessels in the Upper St. Lawrence ordinarily drawing 14 feet in the Rapide Plat

at Morrisburg, went down the river at about 12 feet 6 or 8 inches, and suffered great delays as well, if weather conditions were adverse. Navigation in harbours and bays of limited depth all along the route was cut down in the same way. At each of these points, the proper proportion of the lost depth of water must be attributed to the withdrawal at Chicago of part of the previous water supply of the lakes.

(5) In the year 1910, 20,899 vessels, carrying a total tonnage of 62,363,218 tons, passed through the canals at Sault Ste. Marie, or nearly five times as much as through the Suez canal which is open to the commerce of the world. Of the above vessels 12,927 carrying 25,927, 661tons, passed through on the American side, and 7,972 carrying 36,435,557 tons, passed through the deeper Canadian lock. Considering that the permitted draught of water in the Canadian lock was only seventeen feet and some inches for up-bound boats and eighteen feet and some inches for down-bound boats, and that those of the larger class could not carry within two or three thousand tons of their full capacity, the enormous effect of the loss of a few inches draught upon the earning power of the vessel and upon the trade of both countries is readily seen.

(6) The locks in the Welland and St. Lawrence canals limit the draught of vessels trading to lake Ontario and St. Lawrence river ports, even in times of high water, and a great number of vessels passing through these canals are adapted for 18 feet navigation. With reference to such cases, there can be no question of the adverse effect of the Chicago Drainage canal upon navigation.

(7) Three statements marked "A," "B" and "C" respectively, and appended hereto, indicate with some fair

degree of accuracy the loss in the carrying capacity of Canadian vessels which the allowance of the present application would entail. In statement "A" the actual figures for 1911, for a representative fleet, that of the St. Lawrence & Chicago Steam Navigation Company, Ltd., of Toronto, are set out. Statement "B" extends the computation, on the same conservative basis, to the whole Canadian fleet of bulk and package freight carriers, and Statement "C" suggests results with reference to the grain trade.

(8) Owners of the vessels last described, pay an extremely heavy insurance rate of eight per cent. per annum upon the insurable value of the hulls to cover marine risks as far east as Montreal. In order to decrease the risk of disaster from overloading and other causes, they have recently formed an association known as the Canadian Lake Protective Association, which is empowered to supervise and control navigation methods and punish offences against established rules. During 1911, this Association has been in touch with officials of the Dominion canals, including the canal at Sault Ste. Marie, and has sent out by telegraph from time to time, due notice of the varying drafts of water permitted. It was instrumental in having penalties imposed by the Canal Superintendent at Sault Ste. Marie where vessels overloaded even an inch or two beyond the permitted draft, and similar close supervision was found necessary in the Welland and St. Lawrence canals. In the face of such facts, it is impossible to give serious consideration to the suggestion made by the applicants, that the loss of a few inches depth in the channels is of no consequence.

(9) On the Upper St. Lawrence river an extremely important passenger carrying fleet—that of the Richelieu &

Ontario Navigation Company—a member of the Dominion Marine Association, is very seriously handicapped. Its steamers, which run the various rapids on the St. Lawrence, are the result of an enormous expenditure of time, labour and money in experimenting and in designing and building craft best adapted for their special purposes. They draw every inch of water available and, when the water is too low, are forced out of the rapids and into the canals. Every inch of water taken from the levels and diverted at Chicago means substantial loss to the business of this Company.

(10) All the above remarks apply with proportionately greater force to the much greater tonnage of the United States afloat on the Great Lakes and apply also in proportionate degree to the ocean tonnage trading up the St. Lawrence to Montreal through channels which share the the loss of water occasioned by the withdrawal from the lakes at Chicago.

(11) It is submitted that merely local requirements for purposes of sanitation at Chicago or, at any other individual port, must be subordinate to requirements of navigation of such enormous importance over such wide areas, and especially so where, as in this case, *other methods of sanitation than the dilution method are available.*

(12) If the requirements of sanitation are to become an element in the present discussion, or, if any serious consideration whatever is to be given to the suggestion made by the applicants that the damage may be cured by compensating or remedial works in the lower reaches of the lakes and in the St. Lawrence river, then, it is submitted, a reference to the present International Joint Commission or direct consultation with the Government of the Dominion of Canada will be proper before any decision affecting the

rights of the citizens of both countries is arrived at. This is particularly true with respect to the proposal for remedial works, as the Government of Canada must necessarily be a party to any such method of solving the problem.

(13) The recommendation of the International Waterways Commission in 1907, was not final in its character and was negative in its effect. It did not advocate the allowance of 10,000 cubic feet per second but rather the absolute prohibition of any greater amount. (Par. 43 of the Report).

(14) For the above and other reasons it is respectfully submitted that the application of the Chicago Sanitary District should be refused.

Dated at Kingston, Ontario, the 25th of March, 1912.

FRANCIS KING,
Counsel for the Dominion Marine Association.

STATEMENT "A"

Approximate Loss in Carrying Capacity of St. Lawrence & Chicago Steam Nav. Co's Steamers on one inch draft at Minimum Load Line.

Name of Steamship	Length of Steamship	Loss per in.
E. B. Osler	510 feet	68 tons
W. D. Mathews	376 "	40 "
G. R. Crowe	332 "	32 "
Iroquois	260 "	24 "
Algonquin	250 "	21 "
		185 tons per inch of draft

Cargoes carried in 1911—28 each.

Average freight rate per ton—40 cents.

185x28x40 = $2,156 per season loss for each inch taken from present depths or, for 6 inches, the loss would be $12,936.

TORONTO, March 14th, 1912 A. A. WRIGHT

STATEMENT "B"

Canadian Bulk and Package Freight Fleet on Great Lakes

Name of Steamship	Loss per Inch	—
Emperor	75 tons	Loss in weight carrying capacity per inch of draft at ordinary load draft.
Stadacona	70 “	
Midland Prince	65 “	
Midland King	40 “	
E. B. Osler	70 “	
W. D. Matthews	40 “	
Collingwood	45 “	
G. R. Crowe	35 “	
Agawa	37 “	
	477 tons	Tons less in weight carrying capacity per inch per trip or cargo.
Add 61 vessels of canal size at say 22 tons	1,342	
Total	1,819	

The St. Lawrence and Chicago fleet lost 185 tons per inch per trip, and, at a low freight rate, $2,156 per inch per season. A total loss of ten times as many tons on the whole Canadian fleet (1819 tons) would amount, at a similar low freight rate, to $21,560 per inch per season, or to $129,360 for six inches.

If, in the next decade, the fleet increases at the same rate as in the past decade, this would be over a million dollars loss per annum.

N.B.—On the long haul to Montreal rates might run to $1.50 or $2.00 per ton instead of 40 cents taken above, but, of course, there would be fewer trips, say, 12.

Statement "C."

The Canadian grain-carrying fleet can float, at one time, if fully loaded, to, say, 18 feet draft, at least 8,000,000 bushels of wheat.

1,800 tons loss per inch of draft, even at only 2,000 lbs. per ton, is equivalent to 60,000 bushels, and, at 6 inches loss, this would be 360,000 bushels, or a full cargo for the largest vessel afloat on the lakes. At only 23 trips per season to the Bay or Buffalo this would be 8,280,000, or more than the full capacity of the whole fleet.

COPY OF RESOLUTION OF THE KINGSTON BOARD OF TRADE

KINGSTON, ONTARIO, March 23, 1912

RESOLVED—That the Kingston Board of Trade vehemently protests against the diversion of the waters of lake Michigan by the Chicago Sanitary District, and against the lowering of the levels in the Great Lakes and St. Lawrence river which admittedly results from such diversion;

That, while Kingston is a lake port occupying an important position at the foot of lake Ontario and at the head of the St. Lawrence river, and affords trans-shipment facilities for a great part of the grain trade from the West, nevertheless, this protest is not made for entirely selfish reasons, but rather, because the diversion of water to provide this simple but wasteful method of disposing of the sewage of a single city, entails enormous loss and damage to navigation interests as far down the chain of lakes and river as tidewater, works great injury to the trade and commerce of the country, and threatens, if permitted, to form a precedent for further depletion and damage in order to satisfy the merely local and selfish demands of innumerable other municipalities;

That, for the benefit of both nations, the tremendous investments made in vessel property, and in canals, channels and harbours on the lakes and the St. Lawrence, and the invaluable trade facilities developed in this great waterway should be safeguarded and preserved, and that no local interest should be permitted in any way to prevail;

And, that the Government of the Dominion of Canada be urged to take every step possible to prevent the allowance of the present application of the Chicago Sanitary District.

Signed on behalf of the Kingston Board of Trade, at Kingston, Ontario, March 23rd, 1912.

EDW. RYAN, President
J. H. MACNEE, Secretary

SECRETARY STIMSON: The larger amount of time has been consumed. Technically, there are only ten minutes left. However, as there are six gentlemen yet to speak, according to my memorandum, I will allow half-an-hour more in all. That will give you, gentlemen, five or six minutes apiece.

STATEMENT OF F. S. SPENCE, ACTING CHAIRMAN OF THE TORONTO HARBOUR COMMISSION

MR. SPENCE: Mr. Secretary, in view of the comprehensive way in which the situation has been explained to you, I will not trespass more than two or three minutes and that, merely by offering under the circumstances, an illustration to emphasize the force of what has already been presented by these other gentlemen.

The Harbour Commissioners of Toronto, who have asked me to appear here at this time, compose a public body, having no interests to present but the public interests. Toronto has a population of something like 425,000, and is one of the largest cities of Canada, and is, with the others, vitally interested in this question.

At the port of Toronto we have a landlocked harbour, of something over three square miles, being continuously increased in its area by works. Into this there have been made two very wide channels, at an expenditure of more than $2,000,000. The construction of docks and facilities in the harbour has involved more than $4,000,000 expenditure.

The Commission I represent has property interests there, that are exercised for the public advantage, of more than $5,000,000. Into that harbour, there came last year, 3,192 vessels, with an aggregate tonnage of something over 1,600,000 and carrying approximately, one-half a million passengers, a great many of them from the United States, as was stated by the gentlemen who spoke a few moments ago.

Our situation, Mr. Secretary, is this: A part of that harbour does not provide enough water at low stages for the vessels that come in there. The vessels that come in under present conditions, generally have a draught of 14 feet, and a part of the harbour at our docks does not provide water at low stages to the depth of 14 feet, although we have dredged down to the rock. You can readily understand that, under circumstances of that kind, any lowering of the water would be a serious obstacle to the navigation at that port.

You will understand, then, how we watch with great interest the natural low-water stages which we are obliged to contend with, and how we would view with positive alarm any further permanent reduction of that level, particularly in view of our experience with the lessening of the flow in the St. Lawrence route, to any extent, which would also mean a lessening of the reservoir capacity of the Upper lakes, and, consequently, tend to further lessen what the actual flow would amount to. To cope with that, we would have to go to the enormous expense of removing the rock, or else extend our docks out into deep water; or, if neither of these things was done, it would mean a serious loss to the carrying interests in having to lighten their cargoes in order to get into the docks.

I offer this as an illustration of the situation, as presented by gentlemen who have already addressed you.

Toronto is about the only commodious harbour on the north shore. It is a harbour which vessels in stress of weather must find refuge in. That feature is one of great importance. We have come here arguing in favour of what we think our rights are. While we present the case as strongly as we can, we are not unmindful of the fact that our national interests are very vital to us, and would be considered by you, even beyond treaty terms. I think I can say that Canadians highly appreciate the attitude of the Government shown here, from time to time, on that line, and it is a sentiment, I think, we all highly appreciate.

The other gentlemen here, I think, wish to offer some illustrations on the same line that I have followed, as to how their respective localities would be affected by this proposed diversion.

MR. DAVID SEATH, Secretary of the Montreal Harbour Commission, presented the following letter from the Harbour Commissioners of Montreal:

HARBOUR COMMISSIONERS OF MONTREAL
SECRETARY'S OFFICE

MONTREAL, 25th March, 1912

HON. HENRY L. STIMSON,
Secretary of War,
Washington, D. C.

SIR,—The Harbour Commissioners of Montreal, a body politic and corporate, constituted by Act of Parliament of the Dominion of Canada to administer the Harbour of Montreal, respectfully submit:

That the Harbour of Montreal is the point of interchange of traffic between the ocean and inland navigation, and, in the improvement of which there has been expended $20,000,000, and a further amount of $8,000,000 has been voted by Parliament for the carrying out of further improvements.

That, among the improvements carried out are extensive grain elevators for the transfer of water-borne grain with a storage capacity of over 4,500,000 bushels, and the largest conveyor system in the world for the delivery of grain to vessels.

The Commissioners also have a fleet of floating grain elevators of a capacity sufficient to transfer 25,000,000 bushels of grain from lake vessels to ocean vessels in the navigation season.

That the Commissioners have also, provided the most modern facilities for the expeditious handling of freight of every description.

A dry-dock and ship-repairing plant to cost several millions of dollars are in course of construction.

That the withdrawal of the quantity of water from lake Michigan now taken by the Sanitary District of Chicago is lowering the level of the lakes, and the withdrawal of a larger quantity of 10,000 cubic feet per second now applied for by the Sanitary District, will still more lower the level of all the Great Lakes and outlet rivers, as well as the level of the waters in the canals, and will seriously reduce the carrying capacity of the vessels navigating these canals and thereby be detrimental to the navigation interests of the Great Lakes and the traffic of the Harbour of Montreal.

The Harbour Commissioners of Montreal therefore respectfully urge that the application of the Sanitary District of Chicago now before you be not granted.

We have the honour to be, Sir
Your obedient servants

G. W. STEPHENS, President
DAVID SEATH, Secretary

STATEMENT OF MR. R. W. REFORD

President, Montreal Board of Trade

MR. REFORD: Mr. Secretary, I represent the Montreal Board of Trade, and desire to read a short memorial that we have drawn up on the subject under consideration:

To the Honourable HENRY L. STIMSON,
Secretary of War for the United States:

THE MEMORIAL OF COUNCIL OF THE MONTREAL BOARD OF TRADE HUMBLY SHEWETH:

That the Montreal Board of Trade objects to the application of the Chicago Sanitary District for a further diversion of water from lake Michigan, up to 10,000 feet per second, for the following reasons:

That Montreal is the meeting place of inland and ocean navigation and, that any lessening of the water supply of the navigation routes centreing in Montreal would be an interference with her rights and against her interests;

That any diversion of water out of the drainage basin of the Great Lakes and the St. Lawrence river and into any other drainage basin is contrary to the spirit of the treaties between Great Britain and the United States;

That the Canadian Government has spent large sums in deepening its inland harbours, canals and river channels and that the municipalities on the Great Lakes have expended considerable sums in the same direction, and that all such expenditure will be rendered largely nugatory by any further lowering of the lake levels, and the interests of

Canadians and of the said municipalities should not be ignored:

That such deepening of the harbours, canals and inland channels has, by enabling vessels of greater draught to use them, greatly lowered the inland water freight rates in which so many are interested and that any reduction of these depths will, by lessening the draught of the vessels, involve an increase in the freight rates;

That the needs of navigation demand that the levels of the Great Lakes and the St. Lawrence river be maintained at the highest possible point, all of the harbour works, channels and shipping being adapted to present conditions, and that the proposed diversion of water will alter these conditions materially to the detriment of all water transportation interests on the Great Lakes and the St. Lawrence river to below Montreal, and will occasion irreparable and permanent damage to trade;

That the demands of water transportation are increasing, and that anything which would prevent the expansion of water-carried trade should, in the interests of both Canada and the United States, be prevented;

That it has been demonstrated that the present diversion of water by the Chicago Sanitary District has lowered the levels of the Great Lakes below lake Superior and also the levels of the St. Lawrence river, and it is certain that the diversion of more water will proportionately further lower the levels, and that such reduction of the depth of the channels means a large fixed loss in the earning power of vessels, for the decreased draught forced upon them by such reduced depths of water involves a serious lessening of their cargo carrying capacity;

That the principle upon which the application for further diversion of water is made is unsound and that, if conceded, future demands from other municipalities may be such that, to grant them, would destroy navigation in the commercial sense;

That the use of such great quantities of water by the city and district of Chicago for sanitary purposes is unnecessary owing to the advance of sanitary science, and, that the perpetuation or extension of present methods is a retrograde movement and not in the interests of public health;

That, while the Chicago Sanitary District states that its application is for a temporary use of the water for sanitary purposes, it is known that such water is to be used also for the generation of electrical power, and that, once permanent plants are installed for such generation, the interests vested therein cannot be expected to urge any scheme which will tend to lessen their supply of water power:

That, against the benefit which Chicago will derive from the granting of this application must be set the combined losses which all the other towns and cities bordering on the shores of this waterway will suffer, and further, the power to be developed by the water proposed to be diverted will be a small fraction of the power that may be developed by the same water if allowed to remain in its own proper drainage basin;

That the flow of water through the Chicago Drainage canal should be strictly limited to the quantity of water now allowed, and that the drawing of water in excess of the present allowed quantity be prohibited by the proper authority, and measures be taken to gauge the water now diverted in order to regulate and govern the same.

The whole respectfully submitted,

R. W. Reford
President

Signed on behalf of the Council of the Montreal Board of Trade.

L. Henderson
Chairman of Harbour and Navigation Committee

Montreal, 25th March, 1912

STATEMENT OF MR. F. E. MEREDITH, K.C.

MR. MEREDITH: Mr. Secretary, I will be very brief in what I have to say, but will file a short brief, with your permission.

SECRETARY STIMSON: Whom do you represent?

MR. MEREDITH: I am representing the Shipping Federation of Canada and its members.

As I have not mentioned its members in the brief which I expect to file, perhaps I should do so. I represent the Allan line, the White Star—Dominion line, the Thompson line, the Cunard line, the Donaldson line, the Manchester line, the South African line, the New Zealand Shipping Company, the Head line, the Canadian line, the Hamburg-American line; and then, there are two large coasting companies, the Dominion Coal Company, and the Nova Scotia Steel Company; in addition to that, the Atlantic Steamship service of the Canadian Pacific Railway, and the Atlantic Steamship Service of the Canadian Northern Railway.

All these steamship lines, I have been requested to state, are entirely opposed to the granting of this application, so far as they can oppose it.

I may state, in order to give you an idea of the tonnage, that these lines represent a tonnage of about 590,000 tons, represented by the ships, and the value, I should suppose, would be about $30,000,000.

SECRETARY STIMSON: Are these lines all interested in the navigation of the lower St. Lawrence ?

MR. MEREDITH: Up to Montreal, yes; and, there, they meet the inland carriers, represented by Mr. King.

Secretary Stimson: Where do they claim that the diversion of water will affect them adversely ?

Mr. Meredith: You mean the ocean carrier ?

Secretary Stimson: Yes.

Mr. Meredith: In looking at the Government brief—at all events we know the calculations which the engineers of the Government of Canada have made—we find, taking the harbour of Montreal, that the depth will be lessened by 10¼ inches. That is on page 13* of the Government brief.

Secretary Stimson: I wanted to get an idea of where the shoe pinched, so to speak.

Mr. Meredith: Yes. I may say at once, that although we were satisfied, naturally, with the Government figures—we had no reason to doubt their correctness—yet they disturbed us considerably, to think that there was going to be such a change in the levels, due to the diversion of 10,000 cubic feet per second, and we employed two independent engineers, and their estimates as to the lessening of water in the Montreal Harbour are even slightly greater than is the Government estimate, mentioned on page 13* of Mr. Mullin's brief.

Further down from Montreal, at Lanoraie, which is a few miles down, the taking out of 10,000 cubic feet would mean a lessening in depth of 5·4 inches; and at Sorel, 6·0 inches.

I do not think it is necessary for me to state that the object of all Trans-Atlantic boats is to get up to top of the navigation head as far as they can get. That has been the history of navigation in the world, and the Government of Canada has expended millions of dollars to enable these Trans-Atlantic boats to get to Montreal. We have a minimum draught there, or are supposed to have, of 27½ feet at low water. We load our ships to avail ourselves of every inch in that channel, and, during the low water, we have not an inch to spare. What is going to happen will be this: that if these figures are correct—and we have every reason to believe the figures are correctly quoted by the Government, and verified by our own engineers—we will really lose at the very least, during the low-water months, which in Canada are about four months—August, September, October and November—by the abstraction of this water—this 10,000 cubic feet—10 inches of our draught. Ten inches of our draught, roughly speaking, would mean, working it out as carefully as we can on our present fleet—of course the fleet is increasing each year and the loss would be greater each year—about $332,685. That would be the actual loss; that is working it out, as I have shown, in the brief that I will file.

---

* *Supra*, page 30.

General Bixby: For how many inches of draught?

Mr. Meredith: Ten inches of draught; during the low-water period, that is, which we calculate will be four months. That, we say, is taking the least loss we will suffer with the present fleet. The boats, as we all know, are getting larger. We have only to look at New York harbour and the other harbours of the world to see that that is true, and the larger the boats the cheaper the freight and the cheaper the merchandise to the consumer. If these figures are correct, the remedy, even if the Government of Canada were prepared to remedy and put back this ten inches by dredging, would not meet the trouble, because, even if they were prepared to do that, according to the figures which the engineers have given, which are referred to in the brief filed this morning by the Government, it would cost over

$18,000,000 to put not only the St. Lawrence, but the St. Lawrence waterways and the Canadian waters in their former condition.

And I may say this: A great many ships that are used to carry freight to Montreal across the Atlantic are especially designed for the St. Lawrence. They get from the Government the exact depth they can rely on, and they build their ships to meet these special conditions.

Now, these special conditions, if this application is granted, are going to be entirely changed after people have invested large sums of money to build ships to suit that particular channel, and these ships will be running at a loss and will practically be on the scrap-heap.

That remedy is the only remedy, as I have said, and it will cost the Government $18,000,000, and it will take years to bring about that remedy, and it will be an expense that will have to be borne by the tax-payers.

The ship owners also feel this: that, if once an application of this kind is granted, which will allow our water being taken from this international route, there is no reason why, if it is once granted, other municipalities should not make similar applications and obtain grants.

I thank you very much: I have stated some other propositions in my brief, which I will file with you, and I will not speak further, because I know my time has elapsed.

STATEMENT OF MR. ANDREW ALLAN, PRESIDENT OF THE SHIPPING FEDERATION OF CANADA*

MR. ALLAN: Mr. Secretary, Mr. Meredith has practically stated the case for the Ocean Steamship lines of Canada; but I might enlarge, in a few words, on the position we take.

If it proves to be a fact that, the taking away of the water from lake Michigan for the Chicago Drainage canal has the result of lowering the water in the St. Lawrence from Montreal to the sea, then the port of Montreal and the St. Lawrence route are very gravely affected.

We have been in the ocean steamship business for a great many years, and we have tried to assist in building up the port of Montreal; but, if this is going to have the effect it is claimed it will have, then the port of Montreal is going to suffer, very, very materially, and, as stated by Mr. Meredith, the desire is to bring the large ships to the port of Montreal. In 1906 we built two turbine steamers, the *Victorian* and the *Virginian*, and I have, here, the record of six voyages they made last autumn, beginning with the 15th of September, and ending with the 23rd of November. The depth of water was very low last year; we got down as low as 28 feet. Mr. Meredith made one error, I think, when he stated 27 feet. As a matter of fact, we got down to 28 feet.

To load these ships fully— and we should be able to load them fully, from Montreal— we have to leave a margin between the actual depth and the draught of the ship. To do that we sent these ships out at draughts ranging from 25 feet 5½ inches, to 26 feet, and they went out on the six voyages with vacant space to the extent of 8,340 tons and 25 feet 6 inches draught, the ship drawing 26 feet 6 inches. They would have carried 15,599 tons—practically, 15,600 tons—but they short-shipped 8,340 tons, because there was not sufficient water to allow them to go to Quebec with safety.

---

* NOTE: Some of the figures of draught quoted by Mr. Allan, were incorrectly reporte but are here stated correctly.

If there is going to be further water taken away from the St. Lawrence, then I am afraid it will have the effect of putting the port of Montreal in a very bad position, and it almost looks to me as if the port of Montreal would have to be satisfied with comparatively small steamers, nothing more than 10,000 tons, perhaps.

It may not be interesting to you gentlemen, but to a certain extent I think we ought to explain ourselves. There are bigger steamers under construction at the present time, that it is hoped will be able to come to Montreal. I do not think that we could ever hope to bring them to Montreal if the result of taking of this water from lake Michigan is going to bring about the state of affairs that it is claimed will be the result.

SECRETARY STIMSON: This shortage that you speak of was on those two vessels alone?

MR. ALLAN: Yes; I have not given the figures of what was the result with the other lines, and I have not those figures, but I am sure a great many of them suffered, probably to the same extent we did last year. And, therefore, sir, if I might suggest, from a Canadian point of view, we are very desirous that nothing shall be done to take the water away from the St. Lawrence.

Mr. ALLAN submitted the following communication from the Shipping Federation of Canada:

MONTREAL, March 25, 1912

To Honourable HENRY L. STIMSON
Secretary of War of the United States
Washington, D. C.

IN THE MATTER OF THE PRESENT APPLICATION OF THE BOARD OF TRUSTEES OF THE SANITARY DISTRICT OF CHICAGO FOR THE ENLARGEMENT OF THE TERMS OF AN INSTRUMENT, EXECUTED BY THE SECRETARY OF WAR, MARCH 8, 1899, AS MODIFIED BY SUBSEQUENT INSTRUMENTS, DEALING WITH THE FLOW OF WATER FROM LAKE MICHIGAN

Memorandum submitted by the Shipping Federation of Canada, a body incorporated by the legislature of the Dominion of Canada, one of whose main objects is to safeguard the interests of navigation, more especially of the St. Lawrence route, and whose President and members are the representatives of all the Atlantic, South African and Australian steamship lines trading to and from the St. Lawrence, and, also, of the coasting lines trading to and from the St. Lawrence, and, also, of the coasting lines of steamers trading between Nova Scotia and the St. Lawrence river.

The Canadian Pacific Atlantic steamship lines, trading to and from Montreal;

The Canadian Northern Atlantic steamship lines, trading to and from Montreal.

The above application having been carefully considered by the above Federation, its members and the above steamship lines, it was unanimously decided to oppose the granting of the above application, since, were it granted, navigation of the St. Lawrence route would be most seriously affected, more especially in view of the resulting lowering of the levels on the Great Lakes, the canals and the St. Lawrence river proper. The Federation and the steamship lines above mentioned, rely on what would result, if the application were granted on the levels, on the information obtained and furnished by the Government of Canada in their brief submitted to you and dated March 25, 1912, which shows that a diversion of 10,000 c. f. s. would result in a lowering of the water at Montreal by ten and a quarter inches (page 13)* and they have obtained a report from two independent engineers on the result to the level of water at Montreal in the event of the present application being granted, which agrees on essential points with the conclusions arrived at by the engineers of the Government of Canada.

The number of vessels now employed in the St. Lawrence Atlantic trade to Montreal is seventy-five. These vessels make an average of five voyages per season and, for three voyages during the low-water months of August, September, October and November, the average load of these vessels would be reduced by at least 10 inches, which would work out as follows:

The average load of each vessel would be reduced at 53 tons per inch, or 530 tons on 10 inches—multiplied by three voyages per season equals 1,590 tons average loss of freightage per ship. 1,590 tons multiplied by 75 ships amounts to 119,225 tons, which, at the average freight rate of $2.29 per ton, works out at $273,093 loss of freight per season.

**Supra*, page 30.

In addition to the trans-Atlantic lines, there are some twelve large steamers regularly trading from Montreal to South African and Australian ports, making one trip per season. At least one-half of these vessels would be affected during the low-water months to the extent of ten inches in draught, which, on the average freight of $5 per ton, would work out as follows:

Six ships, average loss on 10 inches reduced draught at 53 tons per inch equals 530 tons per ship, or 3,180 tons loss on 6 ships, which, at $5 per ton, works out at $15,940.

In addition to the above, the carrying capacity of the deep draught colliers in the employ of the Dominion Coal Co. would be materially reduced, and, as shown in the attached letter, dated March 25th, that company, alone, estimate their loss at $43,642 per season.

Summarizing the above the result shows this:

Loss of freight charges on 75 Trans-Atlantic Liners	$ 273,093
Loss of freight charges on South African and Australian	15,940
Loss of freight charges on Coal Carriers	43,642
Total loss on season	$ 332,675

It is to be borne in mind that the loss, if the levels are decreased, will not only be suffered by the ship owners but also by the consumers. The smaller the ship the higher the freight, and it is unnecessary to refer to the fact that the universal practice at present, is to increase the size of the carrying vessel.

It is a fact that a very large number of steamers at present using the St. Lawrence route have been especially designed and built for that trade, relying on the minimum depth of the present channel which is availed of by ship owners to the last inch; that the lines of steamers furnishing this memorandum have a tonnage of 592,584 tons, and a tonnage value of about $30,000,000.

The whole most respectfully submitted

Andrew A. Allan
President, Shipping Federation of Canada

Thomas Robb
Secretary, Shipping Federation of Canada

F. E. Meredith
Attorney for Canadian Pacific SS. Lines, and for
Canadian Northern SS. Line

DOMINION COAL COMPANY, LIMITED

MONTREAL, March 25, 1912

THOS. ROBB, ESQ.
The Shipping Federation
Montreal, P.Q.

DEAR SIR:—Inside of the next year we expect to transport by water 1,800,000 tons of coal per season, to St. Lawrence points. For every inch of water lost to our large carriers we figure conservatively that, in the loss by short-carrying of our present fleet, and the expense of additional tonnage to transport this shortage, we are out $43,642—practically, $523,700 per foot. There are other expenses which can hardly be figured, such as, if 15 steamers can do a certain amount of work on a certain draught, and if this draught is reduced so that it will be necessary to employ 17 steamers, there is bound to be considerable bunching of steamers at loading and discharging plants which we are positive would make our total loss $50,000 per inch on the season's business.

Yours truly

DOMINION COAL CO. LIMITED

P.S.—During the season of 1911 we transported by water to the St. Lawrence 1,480,000 tons.

STATEMENT OF MR. JOHN KENNEDY, CONSULTING ENGINEER, IN BEHALF OF THE GOVERNMENT OF THE DOMINION OF CANADA

MR. KENNEDY: Mr. Secretary, I thank you for permission, but the ground has been so fully covered, that I think it is unnecessary to say anything further than to refer you, sir, to the brief which has been put in, signed by the engineers of the Canadian Government and myself. It gives the substance of all that I would want to say, and therefore it is not necessary to take up your time any further.

MR. MULLIN: Mr. Secretary, by oversight, in stating the gentlemen who were present here, representing Canada and Canadian interests, I failed to give the names of two gentlemen and I would like to have them included in the record. They are Mr. George T. Blackstock, K.C., and Mr. D. H. MacDougall, representing the Toronto Power Company. Mr. Blackstock would like to say a few words.

Statement of Mr. George T. Blackstock, K.C.

Mr. Blackstock: Mr. Secretary, just a word or two, relating to the Niagara river, and the Power companies there.

The intakes of those companies were designed in reference to the levels, as they then existed, at the time of the initiation of these works, and any alterations in those levels very seriously impairs the power of the companies to get their water, and, therefore, to generate the amount of power which their concessions at Niagara entitle them to generate.

Then, there is in addition to that, a very serious difficulty by reason of the accretion of ice which collects along the margin of the river. As you are aware, sir, one of the most serious difficulties every winter at Niagara, is in respect of the collection of ice at various points along the river; and you are aware, sir, that only four years ago a veritable cataclysm took place there, by which the power companies were almost entirely suspended, one of them completely suspended, and the others very seriously interfered with in their operations.

So that any diminution in the volume of water in that river is fraught with the gravest consequences to interests in that locality.

Mr. Secretary, perhaps you would allow me to offer one general observation. This is a very momentous occasion in respect of the interests that are involved here. Around the borders of these international waters are collecting very great populations, who, as time goes on, must from time to time, have increasing temptations to interfere with those problems. Now; the common sentiment of two countries, on either side, has suggested the idea of the protection of these waters, and a great precedent, one way or the other, must, on this occasion, be established: Either it must be said that the common sentiment and interests of the two countries are to be qualified by the particular interest of some one detached community, or else, that the general sentiment is to be maintained in its integrity. Now, I venture to make this observation. The proposed interference by the application now under consideration, is, as has been very well said by Mr. Mullin, extraordinary in its character. It is unheard of. Instead of maintaining the common pool between the two countries, one particular community proposes to very seriously diminish that pool. Does it not fill any ordinary mind with consternation to hear it suggested that some one community, itself the creation of the interests that it is now menacing, itself the creature of trade and commerce, should propose to skim off lake Erie, by this proceeding, no less than six inches of that surface? It appals me, and I venture to suggest that the onus of showing that the rights of navigation are not seriously interfered with, rests with those who are proposing the exercise of these extraordinary powers.

It is quite true, I apprehend, that you would not give any adhesion, or pay any attention to some purely chimerical suggestion of danger; but, on the other hand, is it to be said, can it be said, that that apprehension is slight and ill-founded which brings to your bar every interest from Chicago to the sea, all claiming to be seriously menaced by reason of this undertaking?

That very fact seems to me to constitute a complete answer to the application as made, and to show the very grave consequences which would ensue if it were acceded to.

Secretary Stimson: That will close the hearing.

Mr. J. C. Williams: May I make an enquiry?

Secretary Stimson: Certainly.

Mr. Williams: I believe, at the last hearing, it was agreed that I would file a brief in five days after this hearing. First, I should like to know whether I shall have opportunity to look over the briefs that have been filed to-day. I would like to make reply to them.

Secretary Stimson: I want to give full opportunity to both sides to cover everything they want to say. You have the affirmative of the proposition, as I understand it, and, if you wish to file a reply-brief to those that are being filed now, I am perfectly willing that you should do so, if you can do it within a reasonable time.

Mr. Williams: I was inquiring whether they would be available for my inspection.

Secretary Stimson: Yes; they will be available. Have you extra copies of your brief? (Addressing Mr. Mullin).

Mr. Mullin: I think we have one extra copy.

Secretary Stimson: It would facilitate my office if you had extra copies. Have you had an opportunity to see the brief filed by the other side?

Mr. Mullin: No, sir.

Secretary Stimson: I think the courtesy ought to be mutual.

Mr. Williams: Yes, it should be. It was understood at the last hearing that I would not be required to file a brief until after this hearing today, and I have not filed any brief as yet.

Secretary Stimson: That was the understanding; I suggest that you gentlemen exchange briefs, and, that you arrange between yourselves, the time in which you can do so, and the time in which you can finally file all briefs with me; within reasonable limits I will give you such time as is mutually convenient to both sides.

MR. CAHILL: I have asked permission to file a complete map made by your officers showing the effect of the building of the different obstructions on the lakes, dams, etc., for the purpose of raising the water, which map shows the flooding of the valleys. There has been, since the last hearing, an attempt on the part of the Sanitary District and the State officers to remove some of those dams. This shows how far the valley will be affected.

I desire to say, furthermore, and I presume those papers have been filed, that, in reference to the Illinois valley, they show a permanent damage—

SECRETARY STIMSON: Is it a damage to navigation?

MR. CAHILL: A damage to riparian owners.

SECRETARY STIMSON: You can, of course, file the map, but what I was concerned with, and what I am considering, is the possible damage to navigation.

MR. CAHILL: $200,000 was appropriated by the Government to assist the deep-water interests, and the result has been the plans I have presented. That was to build the deep waterways from the Lakes to the Mississippi valley,

SECRETARY STIMSON: I will consider the map. (Continuing, after consultation with parties on each side of the question) I will allow one week for the brief to be filed by you gentlemen (addressing Mr. Williams), and I will allow Mr. Mullin ten days after that, to reply to that brief.

Thereupon, at 12.45 p.m., the hearing adjourned.

The following additional communications, in opposition to the pending request, were filed, and ordered to be made a part of the record:

RICHELIEU & ONTARIO NAVIGATION COMPANY, OFFICE OF THE GENERAL MANAGER

MONTREAL, March 24th, 1912

Hon. H. L. STIMSON
Secretary of War
Washington, D.C.

Chicago Drainage Canal

DEAR SIR:—With reference to the proposal to withdraw an additional amount of water from lake Michigan, we respectfully beg to submit that we have been operating steamers in the passenger and freight business on the river St. Lawrence since 1867, and anything which has a tendency to lower the natural level of the waters is a matter of the gravest concern. We give you below, a description of the business and the possible effect of lowering the water levels.

Passenger

We carry passengers from the head of lake Ontario all the way down the St. Lawrence river, running the St. Lawrence rapids, and have several millions of dollars invested in vessel property and the business is rapidly growing. Last year we transported 60,000 passengers over the Rapids Division, where the boats have to be especially constructed of a very light draught in order to get through. In this respect we have virtually built, within the past seven years, three special boats of exceptionally light draught on account of low water, at an approximate cost of close on $1,000,000. There is never any too much, in fact, sufficient water in this part of the river and, on several occasions, owing to low water caused by natural conditions, we have been forced to withdraw the service. Last season, which was a season of low water over the entire chain of lakes, we suffered severely and were obliged to cease running the rapids a month earlier than usual.

Inasmuch as our business is a through business, run on a close schedule, making connections with railroads, steamer lines and steamships, anything which interferes with the continuity of the service or puts one division of the line out of commission very seriously affects the earnings, and we are unalterably opposed to granting permission to withdraw water from any of the Lakes which it is known will have the effect of lowering the water further down the chain.

We contend that the importance of this traffic down the Lakes and River cannot be overestimated and that it must be protected.

Freight

An immense amount of money has been spent by the Governments of the United States and Canada, improving channels, dredging and canalizing in order to develop water-borne traffic through the chain of Lakes and the River, and the freight vessels have had the same trouble to contend with, so far as low-water conditions are concerned, as the passenger boats. Last year, vessels carrying cargoes to and from Montreal, were only able to load a percentage of their capacity which very seriously affected their operations, besides increasing the liability to accident and the cost of insurance.

We feel that any application on behalf of a particular district or locality cannot justly be considered separately, but must be judged in its relation to the whole chain of Lakes and River and their protection and general development for the benefit of all concerned.

There is every reason to believe that, in the future, low-water conditions are more liable to occur than in the past and no permission should be granted to take any water which will have the tendency to lower the depth at any other point between that and the sea.

Yours respectfully

C. J. Smith
General Manager

LETTER FROM HON. GEORGE R. MALBY, MEMBER OF CONGRESS

WASHINGTON, D. C., March, 26, 1912

HON. HENRY L. STIMSON,
Secretary of War,
Washington, D. C.

MY DEAR MR. SECRETARY:—I am in receipt of several communications from representative citizens of Ogdensburg, New York, among them Major William H. Daniels, Collector of the Port at that place, and also president of our Deep Waterways Commission, and Mr. Julius Frank, president of, and Mr. John C. Tulloch, secretary of the Business Men's Association, as well as from our local Chamber of Commerce, protesting against any favourable action upon an application now pending before you which permits the diversion of a certain quantity of water from lake Michigan through the Chicago river.

The grounds for these objections would seem to be that it would lower the water in the St. Lawrence river and hence, greatly interfere with the use of our harbours, canals and navigation generally, in the St. Lawrence. While I have not sufficient data at hand to enlighten you very much upon this subject, I do desire to most earnestly call your attention to its very great and far reaching inportance.

The government of the United States has heretofore spent several millions of dollars in the improvement of the navigation of the St.Lawrence river and the harbours of its various ports. It has been found necessary for the government to spend large sums of money in improving the navigation of the St. Lawrence through the Thousand islands in the removal of various rocks and reefs which are so near the surface as to render navigation dangerous and impossible. If the water was materially lowered by this scheme, the work already done by the government would, not only be useless, but navigation either suspended or greatly interfered with.

The work done on our harbours has been controlled with reference to the height of the water at low water as determined by the government at Oswego, New York, and of course should anything be done to lower the water at this point, it would conclusively indicate that the water would be lowered at all points and thus, render more or less useless the large appropriations which have been heretofore made in the improvement of our harbours and rivers.

We must also constantly bear in mind that, between Ogdensburg and Montreal, that our shipping interests are obliged to almost exclusively depend upon the Canadian canals which are maintained and operated entirely free of expense to all users. In other words, their canals are absolutely free under present conditions to American shippers, and it would seem to me as though the very least we could do on this side of the line to compensate for this generosity on the part of the Canadian government would be to see to it that this great canal system, which has cost them, as I recall it, nearly $100,000,000 should not be interfered with, and in fact that nothing should be done unless it was conclusively shown that no injury could come to them on account of any diversion of water at Chicago.

The Richelieu and Ontario Navigation Company also operate a number of vessels plying between Toronto and the Saguenay river and accommodating all intermediate points, such as Montreal and Quebec on the Canadian side, and Buffalo, Rochester, Oswego and Ogdensburg ports on the American side, and, in addition, maintain an American line between Youngstown, near Niagara Falls, and Ogdensburg, New York. Of my personal knowledge this steamship company had last year, and has had at other years when the water was low, not only great difficulty in navigating the St. Lawrence river in its trips down, but for a period of time last year, and different years, found it impossible, even under present conditions, to make their trips.

I might also call your attention to the fact that the water in the Oswego, and in particular at Ogdensburg harbour, at times is very low and navigation well nigh impossible on that account. That port at Ogdensburg has a tonnage of more than a million tons per year, and is constantly increasing in importance. In fact, it is the chief port of entry in tonnage on the northern frontier of the United States, and hence the importance of maintaining its efficiency requires no further argument.

I also think it would be a serious mistake for this country to take any action which is in good faith and seemingly for substantial reason opposed by either the Canadian or provincial or municipal governments, or other important interests just at the present time. I know that I need not refer to the advisability of maintaining pleasant and friendly relations with Canada and all its people, which I fear might be greatly interfered with should their wishes in respect to this matter be unreasonably opposed. So far as the use of the river St. Lawrence and the canals are concerned, they have been more than generous—and at great expense to themselves—to the people of the United States. From the great West to the Atlantic seaboard millions of our people, directly and indirectly, are interested in the preservation of the river St. Lawrence and its system of canals.

I regret that I am not personally possessed of information which would be of value in determining exactly what the effect of this proposed diversion would be, but I presume that there are others who would be able to furnish it. I do know, however, that there are other schemes connected with the Chicago canal besides drainage, and that, if it is found advantageous and profitable to divert a given quantity of water from lake Michigan through the Chicago canal, we can very reasonably expect further applications to be made for additional privileges in the no distant future.

I do not know whether this proposed diversion of water at Chicago would interfere with the treaty recently entered into between the United States and Canada with reference to the use of international water, because I haven't a copy of the treaty before me. Of this, however, you are much better able to judge than I am, but it has occurred to me that, inasmuch as the natural flow of the water from lake Michigan was into lake Huron from the straits of Mackinac, and thence down through the Great Lakes and the river St. Lawrence to the Gulf, that it might be a question whether any action which proposed to change the natural course of this water would not be in violation of our treaty, inasmuch as the treaty itself seems to provide the purposes for which these waters may be used, and that all questions in relation thereto shall be submitted to, and determined by, this international commission. I am simply calling your attention to this matter, however, in order that it may receive your careful consideration.

I am writing you somewhat fully in relation to this subject, because I have been informed that you were to have a hearing upon it Wednesday morning, and, as I have other engagements as a member of the Appropriations Committee, it will be impossible for me to attend.

Very truly yours

George R. Malby

REPLY OF SANITARY DISTRICT OF CHICAGO

In the Matter of the Application of the Sanitary District of Chicago for a Permit to Divert not to exceed Ten Thousand Cubic Feet of Water per Second for Sanitary Purposes from Lake Michigan

To the Honourable Henry L. Stimson
Secretary of War

Sir:—In presenting this statement of the reasons which prompted the Board of Trustees of The Sanitary District of Chicago to make the application which is now pending, and of the reasons why the suggestions made by those who have opposed the application should not have sufficient weight to defeat the application, it is my purpose to confine myself as closely as possible to the suggestion conveyed in the course of the hearings before you, that the sole purpose of the inquiry was to decide whether or not the interests of navigation would be substantially affected adversely by the granting of the permit. I am aware that the law which gives to the Secretary of War the right to issue the permit in question was passed solely in the interests of interstate commerce, and has its life and force only by virtue of the commerce clause of the Federal Constitution. It is assumed however, that in the protection of navigation interests it will not be necessary, in order to render more profitable the navigation of the Great Lakes, to imperil the health of a substantial part of the nation.

It has apparently been assumed in this hearing that the burden of proof is upon the Sanitary District, and that it is incumbent upon it to show that the granting of the permit in question would not substantially interfere with interstate commerce, and that the use of the water of lake Michigan as contemplated is not inconsistent with an existing law of Congress. I respectfully submit that in the absence of a positive law of Congress prohibiting the work in question the State of Illinois, in the exercise of its police power, has a right to prescribe the use to which the waters of lake Michigan shall be put, and that such an act is valid and effective until it affirmatively appears that it conflicts with the powers of the Federal Government with reference to the control of interstate commerce.

The Supreme Court of the United States, in the case of New Orleans Gaslight Co. *vs.* Drainage Commission, 197 U. S., 453, speaking through Mr. Justice Day, uses the following language in describing the governmental character of the exercise of the powers sought to be exercised by the Sanitary District:

> "The drainage of a city in the interest of public health and welfare is one of the most important purposes for which the police power can be exercised."

The law under which the Sanitary District was organized has been declared constitutional by the Supreme Court of the State of Illinois in People *vs.* Nelson, 133 Ill. Rep., and in Trustees *vs.* Wilson, 133 Ill. Rep. It is therefore beyond the stage of discussion that the act is a valid act and a proper exercise of the power of the State, and it seems elementary that that valid law, and the valid exercise of the powers conferred by it, should not be rendered of no effect or interfered with, unless it shall affirmatively appear that it conflicts with some law of Congress enacted under the commerce clause of the Federal Constitution.

It must be borne in mind that there has been no legislation on the part of Congress directly bearing upon the Sanitary District canal. The policy of the United States Government, however, has been well established since 1822. In that year an act was passed providing for the construction of a channel connecting the southern bend of lake Michigan with the Illinois river. Another law to the same effect was passed in 1827, and the State of Illinois, by the act of 1829, accepted the provisions of the Federal acts and by subsequent acts authorized and in fact constructed the Illinois and Michigan canal.

This canal had the effect of re-establishing a prehistoric natural waterway. Geologists are in accord in saying that at one time one of the outlets of lakes Superior, Huron and Michigan was through the valley of the Desplaines and Illinois rivers, and the Supreme Court of the United States, in the case of Missouri *vs.* Illinois, 200 U. S., 496-526, declared the physical conditions which divided the watershed of lake Michigan from the Mississippi river watershed "* * * are of the smallest. And if under any circumstances they could affect the case it is enough to say that Illinois brought Chicago into the Mississippi watershed in pursuance not only of its own statutes but also of the acts of Congress of March 30, 1822, and March 2, 1827, the validity of which is not disputed."

The Illinois and Michigan canal, constructed pursuant to the provisions of the acts above mentioned, had a dual function. In the first place, it was a navigable waterway of the United States and has been so declared by the Supreme Court of the United States, and incidentally to the purpose for which it was designed it disposed of a considerable portion of the sewage of the city of Chicago by a partial and, at times, complete reversal of the flow of the Chicago river.

The Illinois and Michigan canal was completed in 1848. In 1871 the policy of withdrawing water from lake Michigan for navigation and sanitary purposes in Chicago was further recognized by an enlargement and deepening of the Illinois and Michigan canal at an expense of approximately $2,000,000. By 1887 the population of Chicago had increased to about 800,000 inhabitants. It then became a serious problem to prevent a large proportion of the sewage of the city from being emptied into the basin from which its water supply was received, and there was appointed by the mayor of the city of Chicago a Commission of Sanitary Engineers to study the best method of disposing of the sewage, and at the same time protect the water supply of the city. As a result of the investigations made by this Commission the Sanitary District act was presented to the General Assembly of the State of Illinois in 1889, and became effective on July 1 of that year.

In the determination of the question as to the proper method of disposing of the sewage of the city there were brought into consultation the most eminent engineers and experts in the disposal of sewage then available. Every then known method of sewage disposal was investigated and discussed, and the dilution method adopted and the percentage of dilution determined, as stated in the Sanitary District's organic act. Investigations since that time have demonstrated the wisdom of the degree of dilution provided for, namely, 20,000 cubic feet of water per minute for each 100,000 of population, and this percentage is now accepted as the standard minimum rate of dilution which it is safe to apply to domestic sewage (the statements in one of the briefs of those representing the Canadian interests to the contrary notwithstanding.)

The necessity of this degree of dilution is further demonstrated by the analysis of the waters in the Desplaines and Illinois rivers, made during the year 1911 and shown in the report of George M. Wisner, chief engineer of the Sanitary District, dated October 12, 1911, and on file in the office of the chief of engineers.

I also have the honour to submit as an appendix to this brief marked "A" a letter from Professor Edward Bartow, Ph. D., director of the State Water Survey of the University of Illinois, a copy of which has already been filed in your office.

After the passage of the Sanitary District Act work was begun in the construction of the Sanitary District canal for a distance of 32 miles from Robey street in the city of Chicago, to Lockport, Ill., at which point the canal joins the upper basin of the Desplaines river in the city of Joliet. The canal was designed for a capacity of 10,000 cubic feet of water per second, but was actually constructed of a capacity of 14,000 cubic feet per second. The canal was substantially completed in 1898, and the Governor of the State was notified, in order that he might appoint a board of engineers, as provided for in the Sanitary District act, for the purpose of making a report as to whether or not the canal had been constructed in accordance with the authority granted by the General Assembly. Before this board reported and before any water was actually turned into the canal the act of Congress of March 3, 1899, was passed, Section 10 of which gives to the Secretary of War jurisdiction over the navigable waters of the United States. The Chicago river was and is a navigable waterway of the United

States over which the Federal Government has assumed control. The question of the amount of water that might safely be taken through the Chicago river in diverting its course without injuring the interests of navigation became a matter of moment and investigation, and in view of the jurisdiction conferred upon the Secretary of War by the act of March 3, 1899, an application was made for a permit to reverse the flow of the Chicago river and flow through the same a sufficient quantity of water to dilute the sewage emptying into it.

A permit was granted on May 8, 1899, by the Hon. R. A. Alger, then Secretary of War. This permit is shown as an appendix on page 36 of the report upon the Chicago Drainage canal by the International Waterways Commission, 2nd ed., 1907.

It is pertinent to note in this connection, in view of an argument presented by one of the eminent gentlemen representing the Canadian interests, that that permit makes no mention of the withdrawal of water from lake Michigan. The limit placed at that time was a flow of 300,000 cubic feet per minute through the Chicago river. The question of lake levels was not discussed nor mentioned, and the only reason for the limitations contained in that permit are stated to be, the protection of the Chicago river and its maintenance in such manner as to protect navigation and property interests in and along the river.

Subsequently the permit then granted has been modified, always with one purpose in view, namely, the maintenance of navigation in the Chicago river, and the prevention of a current which might be injurious to such navigation. It will at once be seen that up to the time the water was turned into the Sanitary District canal, and, in fact until plans were submitted for the reversal of the flow of the Calumet river in the year 1907 the question of the effect upon lake levels was never considered or discussed and the navigation interests have never even pretended that they had any right to interfere with the carrying out of the beneficent objects of the Sanitary canal, except to require such reasonable regulations as might be necessary to protect navigation in the Chicago river.

The present canal is a growth and development of the policy of both the State and the Nation as expressed in the acts of Congress and of the General Assembly of the State of Illinois from 1822 to the present time, and it is strange that after a policy has been declared and carried out for a period of ninety years, there should be, at this late date, so strenuous an effort to prevent the protection of the lives of the people of that large community because of some supposed and imaginary injury to navigation upon the Great Lakes.

It has always been assumed by those entrusted with the care of our waterways and the protection of our navigation that the works of the Sanitary District should be maintained and carried on. This is abundantly shown by the reports presented to you upon the oral argument. A compilation of quotations from some of these reports which are deemed pertinent, together with references to the reports themselves, will be attached hereto as appendix "B."

We therefore respectfully submit that the rights of the Sanitary District to withdraw water from lake Michigan for sanitary and domestic purposes is not now in question, and the right is reserved at all times to maintain the supremacy of those rights.

The right to control the flow through the Chicago and Calumet rivers we concede is vested in the Secretary of War. In view, however, of the frequent discussions and the insidious efforts made to continually restrict the use of the waters of lake Michigan so that they may not be used for the highest purpose for which they are fitted, the Board of Trustees of The Sanitary District has been prompted to apply for this permit. While we are entitled to the use of the waters of lake Michigan as a matter of right, we also believe that we are entitled to this permit from the Secretary of War, in order that there may be evidenced that "spirit of harmony and conciliation which ought always to characterize the conduct of governments standing in the relation which that of the nation and those of the States bear to each other," as expressed by Chief Justice Marshall in the case of *Gibbons vs. Ogden, 9 Wheaton,* 1; and also to make manifest that which was referred to by Mr. Justice Johnson in the same case as that "frank and candid co-operation for the general good which should always take place where there is a seeming blending of the power of the two governments, and an apparent conflict."

II

I propose now as briefly as I may, and in view of the suggestions made by those who oppose the granting of the application, to discuss the imperative necessity existing to have a permit issued as asked for.

The amount of water asked for is necessary for the protection of the lives of the people of the Sanitary District.

In the oral statement which I had the honour to submit to you I did not think it necessary to engage in a discussion as to the requirements to properly dispose of the sewage of the population now residing in the Sanitary District. In view of the discussions that have since taken place and some of the documents submitted to you, however, it seems now, not inappropriate to very briefly set forth the basis upon which the application is made in this regard.

Experts in the disposal of sewage have been studying the question of the proper degree of dilution necessary, to render sewage innocuous for many years. In 1886 the Chicago Sewage Commission, as heretofore stated, was appointed by the mayor of the city of Chicago with this purpose in view. The most eminent engineers of the world were consulted and their advice taken, and it was then found that the degree of dilution, such as is provided for in the law creating the Sanitary District, was as small a percentage as was safe. The reports of sewage experts the world over are now unanimous in declaring that the degree of dilution provided for in the Sanitary District Act, passed by the General Assembly of the State of Illinois, was proper and necessary, namely, 20,000 cubic feet of water per minute for each 100,000 of population. With a population now exceeding two and one-half millions the Sanitary District actually needs for dilution purposes alone and for the protection of the lives of its people over 8,000 cubic feet of water per second.

The rapid increase in population renders it certain that within a very short time, and certainly by the time the Calumet-Sag channel now in course of construction is completed, the full amount now asked for, namely, 10,000 cubic feet per second, will be required to prevent the sewage of the Sanitary District becoming a nuisance and dangerous to the health and comfort of a large number of people, as well as destructive of one of the great industries of Illinois, namely, the fish industry, which is hereinafter referred to.

Only one answer has been suggested to our claim that necessity exists for the additional water. Those who have opposed the application have stated with confidence that Chicago should adopt some other method of treating its sewage and protecting the lives of its people. This is easily said, but I venture to suggest that no engineer of reputation, would be willing to jeopardize that reputation by unqualifiedly recommending any system of sewage disposal for a city like Chicago.

No one has even had the temerity to suggest that there was any known method at present available which could so efficiently and *economically* be employed in the disposal of the sewage of Chicago. The only conclusion to be drawn is that those who have opposed the application of the Sanitary District care nothing about the economies involved, if those economies are to be practised in behalf only of the public. The only money which they deem important to conserve and save, is money belonging to private interests, and they seem to assume the position that it is the duty of those intrusted with the administration of governmental functions to be heedless of the expense to the public, so long as private interests are protected.

The claim has been made that many cities abroad and at home have successfully treated their sewage by methods other than by dilution. Among those cities are the cities of London, Manchester, Birmingham in England, the Essen District in Germany, and Worcester, Mass., Columbus, Ohio, and Baltimore, Md., in the United States. None of these cities, with the possible exception of Worcester, Mass., is subject to the severe climatic conditions that confront Chicago in the winter time. It has been found by experiment that the best methods of artificial sewage disposal, are much less efficient during extreme cold weather than in the summer months. It has been stated that these plants are only about 50 per cent. as efficient in the colder months as they are during the warmer ones. The dilution method as now employed works automatically, while any artificial method of disposal is dependent upon the human element.

At Worcester, Mass., some 15,000,000 gallons of sewage are treated daily. This sewage, after treatment, is discharged into the Blackstone river, a comparatively small stream—in the dry-weather months, having a drainage area of only 60 square miles. Two-thirds of this sewage is treated by removing the settling solids by chemical precipitation, and the remainder is treated by intermittent sand filters. The resulting effluent is in a highly putrescible state and could not with safety be discharged into any stream that supplied the drinking water of a community. The stream is so polluted that even fish could not exist any time during the year. To treat the sewage of Chicago by intermittent sand filters would require an area of over 7,000 acres, or 11 square miles, and the expense of obtaining the necessary land and preparing beds similar to those used at Worcester would be so enormous as to make it prohibitive.

There seems to be an impression that the city of Hamburg, Germany, with a population of nearly a million, has installed a complete sewage disposal plant. This matter has been investigated, and practically the only thing that is done toward the treatment of the sewage of this community is to catch the heavier solids and remove some of the larger floating matter by means of screens. The only purifying effect this has, is to render the river Elbe more sightly to the eye than it otherwise would be. The resulting effluent from these works is practically unimproved from a chemical or bacteriological standpoint.

The city of London, on the river Thames, where the rise and fall of the tide exceeds 20 feet twice, was compelled to remove the unsightly solids from its sewage. This is accomplished by means of chemical precipitating tanks, and the resulting effluent is allowed to discharge into the Thames some ten or twelve miles below London bridge. The solids taken from the sewage are carried to sea in tank steamers. The resulting effluent by this sewage treatment is practically improved 25 per cent. but would be absolutely unfit to be discharged into a source of water supply.

Manchester treats the sewage of about 600,000 people and the effluent is discharged into the Manchester ship canal. This water is not used for drinking purposes, and such an effluent, according to the analyses made, would be dangerous to discharge directly into lake Michigan in the vicinity of the intakes of Chicago's supply of water.

Birmingham treats the sewage of a population of approximately a million people, and the effluent is allowed to discharge into a small stream. It is true that the effluent is less polluted than the stream itself, but in the stream exist no fish. Neither the stream nor the effluent could safely be discharged into a body of water that was to furnish a community with its water supply.

In the Essen district in Germany no attempt has been made to produce an effluent from the sewage disposal plants that would be safe for domestic use. The only result that is desired is that the river into which this sewage is discharged shall not be unsightly, which has been accomplished.

In the United States, at the city of Columbus, a purification plant was installed so as to avoid a nuisance in the Scioto river, which runs through this city. This river in the summer time is practically dry and the sewage amounts to more in volume than does the discharge of the river. This plant is actually operated only during the lower stages of the river, and during the high stages the sewage is discharged untreated into the river. It is well known that this plant when operated in the winter time is much less efficient than in the summer months. The water of this river is not used for any domestic supply.

The city of Baltimore has installed a large sewage disposal plant consisting of settling tanks and sprinkling filters for the purification of its sewage. It was installed primarily to protect the oyster beds some 18 or 20 miles below the city. The effluent will be discharged into a tidal water, which will never be used for domestic purposes. As this plant has never been operated and is just being completed, it is impossible to say whether the effluent will be inoffensive and non-putrescent, as was stated by Mr. John Kennedy, consulting engineer for the Dominion of Canada.

When the systems as installed in the principal cities in the world are studied it is found that nowhere does a situation exist similar to that of Chicago, where, if any other than the present method was employed, the sewage effluent coming from a disposal station would be discharged into the source of its water supply. Chicago is so situated that it is possible by a combination of partial purification and dilution methods to dispose of its sewage without offence to any one and with perfect safety to its water supply. It is a comparatively simple and inexpensive matter to partially purify sewage, but to so thoroughly purify it as to render it safe to discharge it into the source of a water supply is so expensive as to make it a financial impossibility for the people of Chicago.

It is unfair to compare any American city's sewage disposal scheme with those of foreign cities. The average water supply of foreign cities is about 35 gallons per capita, whereas that of American cities runs as high as 235 gallons per capita, thus making it exceedingly burdensome to treat the sewage of the ordinary American city artificially.

The Sanitary District has expended in the last three years about $100,000 in carrying on an elaborate system of experiments on practical methods of sewage disposal for conditions such as exist in the city of Chicago. As a result of these experiments the Sanitary District has adopted plans by means of which the present dilution method can be augmented and supplemented by the use of partial purification methods, so that it will be entirely possible and practicable with some additional expense to take care of the sewage of Chicago after its population exceeds three millions of people by the installation of partial purification works, the effluent of which will be diluted with water coming from lake Michigan, which will render it innocuous and harmless to the people residing along the Illinois river, through which the effluent flows, and to fish life. But in order to accomplish this it will take a number of years to make the installations. The Sanitary District has already by official action, instructed its chief engineer to prepare plans for the installation of settling tanks to be used in connection with all new works.

Chicago, through the Sanitary District, is taking active steps to force large manufacturing concerns, such as the slaughter-house industries, to remove their trade-wastes from their sewage before discharging it into the Chicago river or the drainage canal. This action will probably cost the industries affected in the neighborhood of a million dollars. Other industries will be affected to a lesser extent, but they are to be forced to purify their trade wastes, so that as the city grows it will require less water per capita for the proper dilution of the sewage coming from this large manufacturing centre.

Generally it is the plan of the Sanitary District to install by the year 1920, at which time it is estimated that the population of Chicago will be three million people, many partial purification works to supplement the general scheme as it now exists. It is absolutely necessary that Chicago so dilute its sewage that when it reaches the Illinois river it will have so purified itself and have an oxygen content that is sufficient to sustain fish life.

As has been stated, the Illinois river is the second largest fish-producing river in the United States, the production exceeding, at the present time, 46 million pounds of fish annually, which are shipped to the dense centres of population and afford the people a cheap food. This industry in the last few years has more than trebled. However, if Chicago is unable to properly dilute its sewage, this river will become so contaminated and polluted that this vast industry will be destroyed.

In case Chicago should be prohibited from discharging properly diluted sewage into the Illinois river it would be forced to discharge it, as before 1900, into lake Michigan, thus creating conditions worse than those which existed prior to the building of the drainage canal, when the typhoid death rate was a disgrace to the community.

The fact that the present channel and the expenditure of 70 millions of dollars would be wasted by the installation of a new plan of sewage disposal at Chicago is not the greatest element of loss to the public. The change of the entire sewerage system in the city of Chicago, which would then be necessary, would involve an expenditure of probably 100 millions of dollars; and in addition to that, the expense of installing and maintaining such sewage disposal works as might at some future time be discovered or evolved must be taken into consideration, and that expense would probably be so enormous that it would impose a burden almost unbearable by the people of Chicago, who have already borne with patience the expense of the monumental works so successfully operated at this time. Such a change could not possibly be made within the next eight or ten years, as it would involve not only the construction of disposal works but also the reconstruction of sewerage systems, the building of large intercepting sewers, and incidental to this, the tearing up of the streets and the repavement of them.

The granting of the request which we now make does not in any wise foreclose the United States Government or the Secretary of War from any action in the future if it shall be demonstrated that the water asked for is unnecessary in the treatment of sewage. If that time shall come it will not only be proper, but, if the interests of navigation are found to have been injured, it will be appropriate for the Secretary of War to revoke the permit and compel a change in the methods.

We deal, however, not with future conditions which are uncertain and indefinite, but with actual conditions which now exist; and so long as they do exist the necessity is imperative that lake Michigan, the great storage basin provided by nature for the comfort and convenience of man, shall be used to promote the health and comfort of those who may avail themselves thereof.

The efficacy of the present method is amply demonstrated by the records of the health department of the city of Chicago before and after the opening of the Sanitary Canal.

The death rate from typhoid fever which, prior to 1900, ranged from 25 to 170 per hundred thousand population, decreased, in 1910, to about 12 per hundred thousand.

The enormous saving of human life effected by this means, therefore, is such that any restrictive measures which would interfere with the operations of the works of the Sanitary District should be applied most hesitatingly and for the most convincing reasons. And it is no answer to this suggestion to say that other methods may be found; for, so far as I am aware, there has been no suggestion in this hearing, or at any other time or place, of a method at present available as a substitute for the city of Chicago.

III

Let us now consider the objections urged by those who fear the effect of a further withdrawal of water upon navigation:

The objection to the granting of the permit made by those who are interested in lake navigation is based upon fears for which there is no basis, and upon speculative theories that up to this time have not been demonstrated to be of practical force. It was suggested by one of the eminent gentlemen representing the Canadian interests that the unanimity with which the protest of the navigation interests was presented, and the cohesion of forces which feared that disastrous results might flow from the use of the lake waters for sanitary purposes should be considered by you as evidence of the substantial nature of the objections which should control in the determination of the question. It may be unfortunate, but it is nevertheless true, that whenever any project or improvement is proposed for the public benefit a large number of persons with no knowledge as to substantial damages to accrue, and actuated only by the fear of an attack on their most vulnerable point namely, their pocketbook, become extremely active, insistent and persistent in defending themselves against even a possible invasion of their so-called vested rights. On the other hand, public interests are often neglected. The body politic is inclined to be lethargic, and only is aroused after the damage has been done and the calamity has befallen the community. The lives, health and comfort of nearly three millions of people are to a large extent dependent upon the action to be taken in this proceeding. The interests of this large population are sought to be represented by a few public servants whose duties require them to conserve the public interest. While it seems impossible to arouse the interest of all this population—who will be more seriously affected than if their source of income were to be interfered with, it seems easy to arouse every interest to a surprising activity, when only dollars are involved. In fact, however, so far as anything appearing in the hearing before you up to this time, no one has been able definitely to state in what manner or to what extent the interests of navigation would suffer or the investments of the transportation companies would be impaired.

It is true that general statements have been made showing the loss of profit to a transportation company by being deprived of sufficient water to load its vessels to their full capacity.

Natural fluctuations of the lake levels, however, are of sufficient magnitude to account for every inconvenience and every loss to which transportation companies have been and may be subjected. An attempt has been made to show that the mean level of the lakes for the past ten years has been below their mean level for the past 50 years. A comparison of the lake levels on such a basis is manifestly unfair. Up to 1886 the mean level of the lakes was much higher than it has since been. At that time the United States Government began improving the connecting channels, and every improvement that has been made has increased the capacity of those channels and the flow through the same, and in that manner reduced the lake levels. The Government improvements in the Detroit and St. Clair rivers alone during the past fifteen years have lowered the level of the water in lake Michigan at least one foot. We state this not in the way of criticism, for we believe that the gain to navigation by the increase in capacity of the connecting channels is largely in excess of any loss to navigation that might be suffered by reason of a general lowering of the level of the lake. We merely call attention to the fact in order to show that it is not fair to compare the levels of the lakes during the last ten years with the levels for any period antedating such Government work. An inspection of the charts prepared by the Lake Survey Corps of the United States Army shows that the level of the lakes has varied substantially in cycles of various durations. In the ten-year period previous to the opening of the Sanitary District channel in 1900 the lowest recorded level of the lake was in 1895. Since 1900 the lowest recorded level was in 1911, and that low level was several inches higher than the low level of 1895. It would not have been unreasonable to expect that at some time within ten years after 1900 the level of the lake would fall to a point as far below the average as in 1895, but even taking into consideration the diversion at Chicago which has already occurred, such has not been the case.

Undoubtedly the concerted opposition to the application of the Sanitary District would not have arisen had it not been for the unusual low-water conditions that prevailed on the Great Lakes during the past year. These conditions were not local to the Great Lakes, but were also prevalent throughout the country. Through the lack of information by the people and interests affected, this low level of the water surface of the Great Lakes has been wrongly attributed to the diversion of water by the Sanitary District. The condition during the past year has undoubtedly been caused by the lack of rainfall.

By consulting plate 22 of the International Waterways Commission Report, on the regulation of Lake Erie (1910) it will be found what has been the loss of level due to the flow of water through the drainage canal. The average stage of lakes Huron and Michigan in 1911 was over six-tenths of a foot (7¼inches) lower than in 1910.

The chart prepared by the United States Lake Survey referred to by me, shows that from May, 1911, when lake Superior was at its lowest stage for the year, it had risen so that on January 1 of this year it was practically one foot and three-tenths higher than in May, 1911. During the same period lake Michigan has only risen about two-tenths of a foot. This can only be accounted for by the fact that the United States Government, in the construction of the new Soo locks, has lessened the capacity of St. Mary river above the rapids by means of coffer-dams, &c. The effect of this has been to store the waters in lake Superior, which naturally would have flowed into lake Huron, and it is estimated that if this flow had not been interfered with, lakes Michigan and Huron would probably have been in the neighbourhood of three inches higher at the present time than they are.

The effect of diverting a certain amount of water from lake Michigan, by way of the Chicago Drainage canal, upon the Great Lakes is a subject that has received the attention of all those who have made a study of the levels of the Great Lakes. To indicate the different results obtained, attention may be called to the estimates given in the report upon the Chicago Drainage canal by the International Waterways Commission (1907), page 7, wherein the effect of the withdrawal of 10,000 cubic feet from lake Michigan at Chicago upon the St. Lawrence river at Rapide Plat is stated as four-tenths of a foot. This is approximately 4¾ inches.

The brief submitted by the Dominion of Canada, to which is affixed the signatures of the engineers who prepared the data therein contained, gives the effect at the same point, of the same diversion, as 6·8 inches. This is a difference of nearly 50 per cent. and is a fair indication of the lack of accuracy with which compilations can be made as to the effect of a diversion from a given body of water.* Generally no two engineers figuring upon this effect arrive at the same result. This is to be expected by reason of the unknown quantities entering into the computation, and also because in making the computation the data obtained by the Lake Survey cannot all be used, and the results must vary according to the data that may be utilized.

---

* *Infra*, page 211.

Counsel for the Dominion of Canada and those representing the vessel interests claim a granting of the permit will result in great damage to the harbour of Montreal. It is claimed that the water surface will be lowered 10¼ inches. How these figures were arrived at, it is difficult to tell, as they seem to be at considerable variance with the report of the International Waterways Commission. The improvement of the St. Lawrence river between Montreal and Quebec was completed in 1906—six years after the opening of the drainage canal. In the report of the Department of Marine and Fisheries for 1910 it is stated: "At the present time a splendid channel of 30 feet at extreme low water exists from Montreal to Cap à la Roche and to Quebec, by taking advantage of the tide." Whatever effect there is upon the St. Lawrence river by the withdrawal of water through the Chicago Drainage canal would have been felt before 1906, and the only additional lowering would be that caused by a greater diversion of water at Chicago since 1906, which is inappreciable.

On chart No. 2483 of the Canadian government charts of the harbour at Montreal, which are on file in the hydrographic office in the Navy Department, there are shown soundings of the harbour at Montreal, showing depths varying from 30·6 feet to over 41 feet. On this chart is the following: "The river (referring to the St. Lawrence) has a very great annual fluctuation and is usually at its highest about the second week in May and at its lowest from about the middle of September to the end of November. Its average height above the datum (low water of 1897) is, in May, 8 feet; June, 6 feet; July, 4¼ feet; August, 3¼ feet; September, 2½ feet; October, 1¾ feet; November, 2¾ feet." So that with a channel dredged to 30 feet below the low water of 1897 there is ample water for vessels of 30 feet draught, and with a river having such great fluctuations due to natural causes it would be difficult, if not impossible, for navigators to notice any effect of the diversion at Chicago upon the St. Lawrence since 1906.*

According to the Forty-third Annual Report of the Department of Marine and Fisheries of Canada of 1910 the total expenditures on the improvement of the St. Lawrence river since 1851 by all public appropriations has been $11,400,000. This is practically the amount that has been expended by the Sanitary District alone in the improvement of harbour facilities in the Chicago river.†

Navigation interests represented by a government that has expended in their behalf less than one-sixth of the money expended by the Sanitary District for health and sanitation should not expect their protests to be seriously considered.

Objection is made by some of the gentlemen who presented arguments in opposition that it was unfair to argue that transportation companies must accommodate themselves to the natural conditions regarding fluctuations in lake levels, and that the argument presented by me in that respect is fallacious. Let us consider whether or not there *is* any fallacy in the arguments relating to navigation.

The only vessels now sailing the Great Lakes which could be affected by any variation in lake levels of from three to five inches are owned and operated by the ore-carrying companies, particularly the Pittsburg Steamship Company, which is a subsidiary company of the United States Steel Corporation.*

---

* *Infra*, page 211. *Ibid*, page 212.

Mr. Livingstone, in his arguments, bases his calculations of the loss of carrying capacity upon boats 600 feet in length, and asserted that they averaged 113 tons per inch of draught, and 22 trips per season. This would result in a loss of tonnage of 2,486 tons per inch of draught. The lake survey chart submitted to you shows that the average level of lakes Huron, Michigan and Erie during the navigable season of 1910 was approximately six inches lower than the level of the same lakes during the same period in the year 1909.

On page 4833 of the printed record of the hearings had before the committee on investigation of the United States Steel Corporation (No. 54, March 11, 1912) is given a statement showing the operations of the Pittsburg Steamship Company for the year 1910. It appears from the testimony taken at that hearing, and on that day, that 30 per cent. of all the ore carried on the Great Lakes was transported by this company. The capital stock of the company, as appears from the statement referred to, is $7,880,000. The net profits of the company for the year 1910, after making deductions for interest charges and liberal deductions for depreciation, extinguishment funds, bond sinking funds, extraordinary replacements, &c., were $2,520,482.92. This is a profit of 32 per cent. upon the capital stock. It is our understanding that the year 1910 was not a year of unusual activity, but, on the contrary, was characterized by periods of business depression which were in some quarters regarded as unusual. We have not at hand the statement of the company for the year 1909, when they had available an average of six inches more water during the navigation season; but can it be reasonably contended, and can it be expected that any weight can attach to the argument that if a beneficent Providence had provided the same amount of water in 1910 as was provided in 1909, increasing the depth of water in the Great Lakes six inches, that the profits of the Pittsburg Steamship Company would have increased in the manner and to the extent indicated by the argument of Mr. Livingstone? If this were true, each boat would have had an increased tonnage of 14,916 tons. It appears from the testimony of the secretary of the Pittsburg Steamship Company, in the litigation now pending between the United States Government and the Sanitary District, that that company operates 73 boats having a draught of 19 feet or more. This would mean a total difference in tonnage of 1,880,868 tons, and in the testimony of Mr. Freer before the investigation committee referred to above, it appears that the average freight rate charged was 65 cents a ton; so that the total increased receipts of this company alone, following such a line of reasoning, would have been $707,764.20 greater in 1910 had the level of the waters of the Great Lakes remained in substantially the same condition as during the year 1909. This would increase the profits of this company by approximately 9 per cent. It may be suggested in passing that if the public has received any benefit in the reduction of the price of steel by reason of these enormous profits, that benefit is not apparent to the casual examiner. The price of steel rails, as we are informed, has remained constant since the organization of this corporation.

---

* *Infra*, page 208.

We make these observations to show the character of the arguments presented against us, and the claims of those who make them, upon the protecting arm of the National Government, when brought into conflict with the higher function of government, in the preservation of human life and the promotion of the general welfare.

These suggestions are also submitted for the purpose of calling attention to the fallacy of the whole case presented by those who oppose our application on the ground of the loss of profits to the navigation interests. The fallacy lies in this, that the profits of the transportation companies depend, not upon depth of water, but upon the amount of freight carried. It is not and cannot be truthfully contended that any freight has not been carried by reason of lack of water which otherwise would have been. The commerce of the Great Lakes consists of a certain tonnage each year, and that tonnage is accommodated and cared for. The profits earned depend upon the volume of business and the rates charged. It is a well-known fact that it is more economical to use the deep-draught vessels, even when not loaded to their fullest capacity, than boats of the older type, and this is evidenced by the hundreds of boats lying idle in the ports of lakes Erie, Huron, and Michigan because they have been superseded by boats of modern type.

The present diversion from lake Michigan at Chicago through the Chicago river is limited to 4,167 cubic feet of water per second. This limitation was placed upon the Sanitary District not because of any effect on lake levels or lake commerce, but in order to protect the Chicago river from an excessive current. It is true that at certain times there has flowed through the Sanitary District channel and over its dam at Lockport a volume of water largely exceeding this amount, but regard has always been had to the maintenance of a safe current in the Chicago river. General Bixby, in his report quoted to you, asserts that the average amount now used by the Sanitary District is 7,000 cubic feet of water per second. This is more than the usual flow. But assuming that that statement is true, has any one appeared who has made the slightest claim that up to this date navigation has been injured by the operation of the Sanitary District canal? The contrary seems to be abundantly established. Every man conversant with navigation on the Great Lakes knows that during the past ten years the vessels that have been built have been built with larger capacity and deeper draught than ever before, and the tonnage now handled on the Great Lakes is greater than ever in the history of navigation in the United States. Why, then, this great fear that an additional grant of authority to use that which is necessary to preserve human life will bankrupt the transportation companies of the country?

According to the computations made by the International Waterways Commission, the effect upon the levels of lakes Huron and Michigan of the diversion of 3,000 cubic feet of water per second in addition to that now taken would be 1·25 inches, and in the St. Lawrence river 1·40 inches. It must be borne in mind that even conceding 7,000 cubic feet of water per second has been withdrawn from lake Michigan by the Sanitary District, such concession is not an admission that the permit heretofore issued by this Department has been violated, for, as already pointed out, none of the permits in any way limited the amount of water to be diverted from lake Michigan. They were directed solely to the amount of water that should be taken through the Chicago river, the purpose being to maintain navigation on that river and prevent an excessive current. As already stated, 2,000 cubic feet is capable of being withdrawn through the Thirty-ninth street conduit entering the river practically at the beginning of the canal. This amount, added to the 4,167 cubic feet authorized to flow through the Chicago river, makes a total of 6,167 cubic feet per second, and in addition to this there is a considerable flow through the canal of water withdrawn from the lake through the cribs and pumping stations used in the maintenance of the city's water supply.

As I attempted to show in the oral hearings, Chicago is itself interested in the maintenance of navigation and commerce, and will do everything in its power to protect them. No community in the United States and no port on the Great Lakes is more desirous of encouraging the activities incident to lake commerce. We merely feel we should be entitled, at least until it has been demonstrated that our works are injurious to the interests of navigation, to have the health and lives of our people protected.

The subject of the effect upon lake commerce of the diversion of water through the Sanitary canal has been discussed many times and by many eminent engineers in the employ of the Government. It should be borne in mind that this work was not undertaken without thorough knowledge on the part of every well-informed engineer and official of the United States, and it seems strange that, after the successful operation of more than twelve years with no bad effects yet noticeable from such operation, the benefit of the tremendous expenditure made by the people of Chicago should be denied because of fears as to future effects not borne out by past experience.

The effect of the diversion of 10,000 cubic feet of water per second has been calculated with a great deal of care by the engineers in the Lake Survey. If all the theories can be relied upon, the observations are accurate, and calculations fairly made, it is probable that such a diversion would be theoretically determined as affecting the level of lake Michigan to the extent of about five inches.

I do not wish to question the accuracy of the figures or the fairness of the calculations, but in view of the actual conditions existing in the lakes during the past ten years, I am constrained to say that I believe that there are unknown quantities and unknown conditions affecting lake levels which have not yet been determined or appreciated. The fact is indisputable that with a constant diversion through the Sanitary channel since January 17, 1900, the average level of lakes Michigan and Huron was higher during the ten years immediately following than it was the ten years immediately preceding the opening of the channel. Of course it is immediately stated in answer to this, that this rise in lake levels was due to natural conditions, rainfall, &c. But it is equally true that the abnormally low condition of the lakes during the past year and at the present time is also due to the same natural conditions,—rainfall, &c. In all the arguments presented to you the basis of the complaints of those who oppose our application seems to be a diversion of 10,000 cubic feet. It was asserted that we are already withdrawing from lake Michigan from 4,000 to 7,000 cubic feet of water per second, yet not a single complaint is made, not a suggestion offered, that up to this time navigation has been injuriously affected. Why then the fear that the additional water asked for would bring such a calamity to the interests of commerce and navigation?

Chicago River Navigation

Objection is made by some of those who appeared before you that the granting of the permit in question will injuriously affect navigation in the Chicago river. As has already been pointed out the limitations placed upon the Sanitary District do not refer to the amount of water to be taken from the lake, but have reference entirely to the conditions of that river and were imposed for the purpose of protecting navigation and preventing a current above that in which navigation may be properly conducted. The granting of the permit in question will increase the flow through the Chicago river eventually by 2,000 cubic feet of water per second. That is to say, of the 10,000 cubic feet of water to be withdrawn from lake Michigan, 6,000 feet will eventually flow through the Chicago river, 2,000 through the Thirty-ninth Street conduit, and 2,000 through the Calumet-Sag channel now in course of construction. In order to protect the interests of navigation, and in order to prevent a current injurious to commerce, the Sanitary District has acquired property adjoining the river, paying therefor nearly $5,500,000; has expended in dredging the river to a depth of 26 feet approximately $2,500,000; has removed centre-pier bridges and constructed in lieu thereof bridges of the bascule type with wider openings at the aggregate cost of over $3,000,000.

The project undertaken by the Sanitary District involves the widening of the river to a uniform width of 200 feet and dredging to a depth of 26 feet. This project is now practically completed except at those points where the work is delayed pending a decision by you of controverted questions of law and fact in relation to the removal of certain bridges. The grand total of the sums of money expended by the Sanitary District up to this time in the improvement of that river and in the protection of navigation interests amounts to $11,437,820.69. This is an ample guarantee that the Sanitary District is safeguarding the commercial interests of the port of Chicago, and is doing all in its power to see to it that navigation will not be interfered with nor the interest of her Canadian friends injuriously affected. As pointed out in another part of this brief, the amount expended on this project alone exceeds the total amount expended by all public bodies of the Government of the Dominion of Canada in the improvement of the St. Lawrence river since 1851.*

The improvements herein referred to provide for a flow of 6,000 cubic feet of water through the Chicago river, with a current not to exceed one mile per hour, and it is generally conceded by the navigation interests that a current of a mile and a quarter, as now permitted, is safe and not such as to create any hardship upon those seeking to use this waterway. At the time the first permit was issued by the Secretary of War, in 1889, the Chicago river was obstructed by centre-pier bridges, was narrow and shallow, and in some places its width did not exceed 90 feet and its depth did not exceed 16 feet. Navigation was interfered with, not only by the bridges and the narrowness of the channel and the shallowness thereof, but by tunnels constructed by the street railway companies and the city of Chicago, which have been removed in order to fully carry out the project of the Sanitary District for the improvement of the river and providing for the flowage necessary to purify the sewage. These considerations have to do, of course, only with navigation and commerce. We cannot, however, forbear again reverting to the fact that a still greater public benefit has come from changing the river from a putrid, ill-smelling nuisance into a clear, running stream which is no longer an eyesore or a menace to the inhabitants of the city.

---

* *Infra*, page 212

Illinois Valley.

Protests have been filed against the granting of this permit largely conditional in their nature, by the Association of Drainage and Levee Districts of the State of Illinois. The protestants who are responsible for the resolution sent by that association and by the city councils and chambers of commerce of certain cities and towns in the Illinois valley are fully acquainted with the beneficent results flowing from the use of the Sanitary District channel for the purpose for which it was constructed. As in other cases, these protests are based on the financial injury which will result from the supposed additional flooding of their land and the increased cost in the constructing of levees and the maintenance of levee districts. Of course, it is apparent that this has nothing to do with the question of navigation to which you confined the arguments at the hearing. Mention is made, however, of the subject-matter because the protests are conditional and are predicated upon the present existence in the river of four dams, two maintained by the State of Illinois, through the Illinois and Michigan Canal Commissioners at Henry, and Copperas creek, and two maintained by the United States Government at Kampsville and La Grange respectively. The representatives of these associations were present in Chicago prior to the hearing on the 27th ult., and expressed themselves as perfectly satisfied with the progress being made toward the removal of these dams, and they concede that if the dams are removed their protests should be withdrawn. The State of Illinois, through its Canal Commission, has already taken action which will permit the Sanitary District, at its own expense, to remove the State dams. A bill has been introduced in Congress to remove the Government dams at Kampsville and La Grange, which so far has aroused no opposition. The only excuse for the presence of these dams was to maintain a sufficient depth of water in the Illinois river to provide for navigation by boats having a draught of seven feet. All agree that with the water now being sent to the Illinois river through the Sanitary District canal this depth can be maintained without the presence of the dams. We apprehend that there will be no difficulty in removing these dams before the full amount of water asked for is abstracted from lake Michigan, and the removal of the dams will afford a channel of sufficient capacity to accommodate the flow of all the water asked for with less damage to the adjacent property owners than is caused by the present flow. I think I may say without fear of contradiction that had the progress which has been made toward the removal of these dams been made some months ago no protest would have come from this source, but, on the contrary, the application would have been endorsed and the co-operation of the protestants would have been assured to us in the pending matter.

Rights of the Dominion of Canada under the Treaty of January 11, 1909

A large part of the argument submitted by the Dominion of Canada consists of an attempt to ingeniously argue that by reason of the treaty between the United States and the

Dominion of Canada, signed on January 11, 1909, the Dominion Government has a right to have a voice in the question as to the amount of water that shall be diverted from lake Michigan for sanitary and domestic purposes.

With the proposition that the United States Government should at all times, as a matter of comity, listen to all protests and arguments that may be submitted by a neighbouring friendly government against any exercise of its governmental functions, and that the same policy should be pursued by the officers entrusted with the administration of the laws of Congress, I have no quarrel. No complaint can be made, and none is here suggested, that the Dominion authorities and the Canadian interests were permitted to state their views freely in connection with the subject-matter pending before you. This opportunity, however, was a matter of comity and courtesy, and not a matter of right; and the opportunities thus afforded are not based upon any provisions of the treaty in question.

Counsel for the Dominion Government admits that lake Michigan is not included within the definition of boundary waters as contained in the treaty. This lake is entirely within the territorial limits of the United States, and it would have been inappropriate to have included it within the term "boundary waters." This was recognized in the treaty itself, and the only rights given to Canada on lake Michigan are those conferred by the second paragraph of Article I, in which it is provided:

> "It is further agreed that so long as this treaty shall remain in force this same right of navigation shall extend to the waters of lake Michigan and to all canals connecting boundary waters, as now existing, or which may hereafter be constructed on either side of the line."

It seems to us that Counsel occupied a dual position in claiming that the right of Canada to navigation was based upon the clause above quoted, thus admitting that, so far as navigation was concerned, lake Michigan was not a boundary water as defined in the treaty, and at the same time urging that Canada had a right to have a voice in the manner in which the waters of lake Michigan should be used for sanitary and domestic purposes, on the theory that it is a boundary water as defined in the treaty.

There can be no question but that lake Michigan was intentionally omitted from the provisions of the treaty; and this was proper. There was no reason why the United States should abandon its dominion over, and control of, a body of water lying entirely within its own boundaries. An examination of the record of the negotiations leading up to the adoption of the treaty will disclose that the subject-matter was discussed and that it was the intention of the parties to exclude this body of water from its provisions.

The right of those interested in navigation in Canada to protest against any diversion of water from lake Michigan is not based upon this or any other treaty, but stands upon the same footing as any individual who is permitted to express his views to one charged with the performance of an official duty.

So far as the government of Canada itself is concerned, it is *expressly precluded* from entering any protest in this proceeding. Even assuming, for the sake of argument, that the government of Canada, as such, is entitled to have any voice as to the use to which the waters of lake Michigan shall be put, that Government has bound itself by the terms of the treaty itself to refrain from protesting against the use of waters for domestic and sanitary purposes if the only purpose of such protest is to protect navigation. If the right of the citizens of Canada to navigate lake Michigan should be exercised by those citizens to the detriment of sanitation, and such use should interfere with the use of the waters of lake Michigan for domestic and sanitary purposes, then the Government of Canada would be guilty of violating the terms of the treaty.

Article VIII of the treaty expressly provides as follows:

> "The following order of precedence shall be observed among the various uses enumerated hereinafter for these waters, and no use shall be permitted which tends materially to conflict with or restrain any other use which is given preference over it in this order of precedence:
>
> "1. Uses for domestic and sanitary purposes.
>
> "2. Uses for navigation, including the service of canals, for the purposes of navigation.
>
> "3. Uses for power and for irrigation purposes.
>
> "The foregoing provisions shall not apply to or disturb any existing uses of boundary waters on either side of the boundary."

It has been a matter of some surprise, in view of this definite and positive provision in the treaty as to the order of precedence to be observed in the uses to which the waters of the Great Lakes shall be put, that the Government of Canada should appear protesting against the use of the waters of lake Michigan for sanitary and domestic purposes, on the ground that navigation will be interfered with. Some attempt is made to escape from the plain and natural interpretation of the words above quoted by calling attention to the last clause of Article III of the treaty.

The last paragraph of Article III is intended to guarantee to each Government the right to carry on its own works on its own side of the boundary line; and the last clause provides as follows:

> "Nor are such provisions intended to interfere with the ordinary use of such waters for domestic and sanitary purposes."

Because of the use of the word "ordinary" in this clause, Counsel would insert it into Article VIII above quoted, making the first and paramount use to which the waters of the Great Lakes may be devoted "ordinary uses for domestic and sanitary purposes."

Manifestly, this was not the intention of the framers of the treaty. This is evidenced, first, by the fact that the word "ordinary" was not used; second, because it is expressly provided that the provisions shall not disturb any existing use of boundary waters on either side of the boundary; and if, under any construction, lake Michigan could be construed as a boundary water because of its connection with lake Huron, the Canadian Government had full notice of the fact that the waters of lake Michigan were at the time of the signing of the treaty, being used for the purpose of diluting the sewage of the city of Chicago; and they consented that no provision of the treaty should interfere with that use. If the water of lake Michigan is to be used to dilute the sewage of Chicago, a sufficient quantity thereof must be appropriated for that purpose, and the Canadian Government was fully aware of the plan for the treatment of sewage which had been adopted and carried out by that city.

Counsel for the Dominion, as well as the representatives of the navigation interests, were careful to reserve the right to protest hereafter under the terms of the treaty, and called attention to the last paragraph of Article II, as follows:

> "It is understood, however, that neither of the high contracting parties intends, by the foregoing provision, to surrender any right which it may have to object to any interference with or diversion of waters on the other side of the boundary, the effect of which would be productive of material injury to the navigation interests on its own side of the boundary."

This clause was not inserted for the purpose of giving either Government any right not already enjoyed by it. The right of one nation to protest against acts of another, which may be detrimental to the integrity of the nation or the interests of its inhabitants, is founded not upon treaties, but upon the general principles of international law; and this clause merely means that those general rights were not to be construed as having been taken away by the treaty, and it was not intended that the treaty should give them additional rights.

It may be here observed that a protest from the Dominion of Canada against the lowering of lake levels comes with rather poor grace. It is a matter of record in your department that during the improvement of the Detroit river in the construction of the Livingstone channel the United States Government sought to maintain the level of the lakes by the construction of remedial works on the Canadian side. A protest was entered on behalf of the Canadian Government, and those remedial works have not been constructed as was planned by the United States engineers.*

The rights of the Dominion of Canada and the obligations of the United States arising under this treaty, in so far as the control of the waters of lake Michigan is concerned, would be decided adversely to the Dominion Government, according to the principles of law that are clearly set forth in the opinion of Hon. Judson Harmon, Attorney General in 1895, rendered to the Secretary of State construing the treaty of Guadalupe-Hidalgo (Opinions of Attorney General, volume XXI, page 27).

---

* *Infra*, page 214.

On page 30 of the brief submitted by the Dominion of Canada this statement appears:

> "Chicago is at the stagnant end of what is practically a stagnant lake, fed only by small streams, nearly all of which discharge into it the sewage of a large and rapidly increasing population, and the drainage wastes of large and growing industrial establishments."

This statement is surprising in its inaccuracy. The engineers in your department will inform you that, if lake Michigan were a stagnant lake, Chicago would be at the headwaters of the watershed. It is well known that the waters of lake Michigan are more potable than those of any of the Great Lakes, except lake Superior, and, except in the vicinity of large cities which may be permitted to discharge their sewage into it, is a source of an abundant and exceptionally good supply of drinking water.

Compensating Works

In view of the great importance to the people of Chicago that the request now made be granted, we have made some study of the question of the cost of such compensating works as might be necessary to nullify any effect of a diversion through the Sanitary District canal if such effect should be deemed injurious to navigation. This subject is one which requires great study and elaborate computations. It has been a subject which has been given consideration by many of the most eminent engineers of the country; and, bearing upon the general proposition of the practicability and efficacy of such works, I have the honor to attach hereto as an appendix, marked "C," a letter from Alfred Noble, of New York city, who is recognized as one of the most eminent engineers of the country.

I suggest, also, that Mr. Noble by his letter endorses in large degree the report of the Chief Engineer of the Sanitary District, to which reference has been made.

Conclusion

We respectfully submit that it is abundantly shown:

1st. That there is an imperative need of the waters of lake Michigan for sanitation purposes, as specified in our application.

2d. That the Sanitary District canal is the outgrowth and development of a scheme recognized by the United States Government, the Dominion of Canada, and the State of Illinois since 1822.

3d. That we are entitled, as a matter of right, to the use of so much of the waters of lake Michigan as may be necessary for sanitary and domestic purposes.

4th. That no substantial injuries have been shown to have been suffered by navigation interests in the past, and that the fears of future damage are too indefinite to weigh against the pressing needs of sanitation.

5th. That navigation in the Chicago river will be abundantly protected by such restrictions as may properly be imposed by the War Department.

6th. That the conditional protests of the associations and cities in the Illinois valley were based upon conditions that are already being eliminated.

7th. That the Dominion of Canada has no right under the treaty of January 11, 1909, to any voice in the disposition of the waters of lake Michigan for sanitary purposes.

8th. That, even if it shall be possible in the future to care for the sewage of the Sanitary District without the use of the additional water asked for, the permit should be issued until such conditions arise, when the permit may be appropriately revoked or altered.

We agree with one of the eminent gentlemen who spoke on behalf of the Canadian Water Power Company, when he said that the question to be decided in this matter is a momentous one and of supreme importance.

It is a question as to whether or not fears shall be allowed to prevail over facts, and whether or not possible profits to navigation interests shall be considered of greater importance than the lives of the people of a community comprising one-thirtieth of the population of the nation.

We feel confident that the decision will be in the interests of humanity, and that the public interest will be protected and the general welfare promoted.

Respectfully submitted

John C. Williams
Attorney for Sanitary District of Chicago

Approved
George M. Wisner
Chief Engineer

APPENDIX "A"

URBANA, ILLINOIS, March 28, 1912

Hon. HENRY L. STIMSON
Secretary of War, Washington, D. C.

DEAR SIR,—Owing to the limited time, I did not have an opportunity to speak in behalf of the request of the Sanitary District at the hearing on February 28th. I, therefore, request the privilege of making a brief statement.

The Illinois State Water Survey has been analyzing the waters of the Illinois river for a number of years. Our investigations show that the dilution at the present time is none too great, and should the flow be decreased we are certain that a nuisance would result during parts of the year. We, also, have been in close touch with the work being done by the Sanitary District, and feel that they are acting in good faith in their experiments to determine the proper method of disposing of the sewage of the increasing population of Chicago.

It is the business of the State Water Survey to make investigations which will enable the people of the State to have a pure water supply, and it is our belief that the sewage of Chicago must be diverted from the Lake, and that the curtailment of the amount allowed would work a hardship on the citizens of Chicago.

Our observations throughout the State have brought to our attention the fact that the last two years have included the periods of the lowest water in the Mississippi river as well as in the Great Lakes. The effect of withdrawing 10,000 cubic feet per second of water through the drainage canal will have an inappreciable effect in lowering the level of lake Michigan as compared with the lowering that is being produced by enlargements in the channel of the Detroit river carried out by army engineers. Statements were made that lake Superior, which cannot be affected in the least by the drainage canal, is lower than it has been for years. Likewise the Mississippi river, even below the outlet of the Illinois river where it is augmented by the drainage canal, has, during the past year, reached the lowest stage in many years.

We sincerely hope that after careful consideration you will see fit to grant the petition of the Sanitary District, which desires to take only one-twentieth of the flow from the Great Lakes. It is our belief that any lowering of the lake Michigan level which this withdrawal might cause can be counteracted by the construction at the outlet of lake Huron, of wing dams instead of dredging the channel as is now the practice.

Very truly yours

EDWARD BARTOW
Director State Water Survey

APPENDIX "B"

Extract from Report upon the Chicago Drainage Canal by the International Waterways Commission, Second Edition, 1907

19. In the expenditure of $40,000,000 for the drainage canal the people of Chicago, with its population of two million, incurred a burden equivalent to that due to an expenditure of $1,600,000,000 by the United States, with its population of 80,000,000—that is, enough to build eight or more Panama Canals. It was a very serious effort and has commanded the admiration and sympathy of all observers. The diversion of 10,000 cubic feet per second from lake Michigan affects other interests adversely, but these interests have withheld their opposition, seeming to believe that some such amount was necessary, and apparently willing to contribute their share to protect the lives and health of the people of a great city. The plans calling for that amount have been under public discussion for some years. Although withholding formal approval, the Federal authorities have taken no steps to prevent their execution. Congress has called for a plan and estimates for an improvement of the waterways connecting with it, the scope of which is fixed by that amount. There appears to be a tacit general agreement that Chicago needs, or will need, about 10,000 cubic feet of water per second for sanitary purposes and that the city should have it without further question.

* * * * * * * * * * *

43. A careful consideration of all the circumstances leads us to the conclusion that the diversion of 10,000 cubic feet per second through the Chicago river will, with proper treatment of the sewage from areas now sparsely occupied, provide for all the population which will ever be tributary to that river, and that the amount named will therefore suffice for the sanitary purposes of the city for all time. Incidentally it will provide for the largest navigable waterway from lake Michigan to the Mississippi river which has been considered by Congress.

We therefore recommend that the Government of the United States prohibit the diversion of more than 10,000 cubic feet per second for the Chicago Drainage Canal.

Extract from Report of Engineers on Deep Waterways Between the Great Lakes and Atlantic Tidewaters, Made in 1900.

(Page 83:) The mean level of lake Huron and lake Michigan is about one foot lower than it was fifteen years ago, which change has resulted from the enlargement and deepening of channels for waterways improvements and from the natural erosion of the bed of the river at the outlet of the lake.

Extracts from Letter of W. H. Bixby, Lieutenant-Colonel, Corps of Engineers, Chicago, to Chief of Engineers, Dated May 22, 1906. *Document No.* 6, 59th *Congress, First Session.*

Consequently any question as to the volume of diversion of lake Michigan waters into the Mississippi River basin must look forward to demands for a much greater diversion than the 10,000 cubic feet per second now needed by the Sanitary Drainage District, and greater, even, than the 14,000 cubic feet per second now requested by them for present and future use. In my opinion, the War Department must look forward to a future not unreasonable demand for from twenty to thirty thousand cubic feet per second for navigation and sanitary purposes to be taken out of lake Michigan at points along the Wisconsin, Illinois, and Indiana shores. * * *

Furthermore, by reason of winds and barometric effects, oscillations of six inches several times in a single day are frequent, and two to four feet within an hour are occasionally experienced. Consequently, individual exceptional levels are misleading, and the general effects of water diversions must be measured upon the annual average rather than by monthly or daily. * * *

Summing up the matter, it may be briefly stated, therefore, that 10,000 cubic feet per second diversion of water from lake Michigan into the drainage canal will be probably not unreasonably obstructive to navigation and injurious to property, if divided up into 6,000 cubic feet per second through the main river, increased by 2,000 cubic feet per second more through the Thirty-ninth Street sewer, and 2,000 cubic feet per second more through Calumet river (10,000 cubic feet per second in all), but that an increase in these amounts to 8,000, 2,000, and 4,000 cubic feet, respectively (14,000 cubic feet per second in all), will probably prove to be unreasonably obstructive and injurious. Also, that the 10,000 cubic feet per second will eventually and permanently lower the levels of lakes Michigan and Huron by about .5 foot, and lake Erie by about .4 foot, and 14,000 cubic feet per second will make these depths

0.7 and 0.6 foot respectively, which will be quite costly in future results.

Extract from Report of Board of Engineers, Contained in Annual Report of the Chief of Engineers for 1900, *page* 5401; *and for* 1902, *pages* 2279 and 2825; *also for* 1904, *page* 4120

Oscillations of more than six inches in the level of the lake's surface are very common, even occurring hourly for many hours in succession, while oscillations of two or three feet within an hour are not uncommon. Still greater oscillations within a year or a series of years occur from natural causes. Moreover, during a severe winter the discharge of St. Clair river is reduced by ice to less than one-third its normal discharge; the remaining two-thirds being stored up in lakes Huron and Michigan and raising their levels, and the difference between the total discharge during a severe winter and the discharge during a mild winter will probably equal, or nearly equal, the discharge of the Chicago Drainage canal for a year.

A permanent average lowering of six inches in the lake's level is not easily observed and will probably not be noticed by navigators.

APPENDIX "C"

New York, N. Y., April 2, 1912

Mr. John C. Williams
Attorney, Sanitary District of Chicago

Dear Sir: You have requested me to express opinions on the following points:

1. Is it practicable to compensate for an increased diversion through the Drainage canal from 4,000 cubic feet of water per second to 10,000 cubic feet per second, by obstructions in the natural outlets of the Great Lakes so that the natural levels of the lakes may be maintained?

2. Assuming that the population of the Sanitary District will be 3,000,000 in 1920, and that the sewage from this population would be sufficiently diluted for sanitary purposes by a supply of 10,000 cubic feet per second, is it practicable to provide the works for the partial purification, as designed and estimated for by the Chief Engineer of the Sanitary District, in time to provide for the subsequent increase of population?

3. If the existing permit to divert water from lake Michigan were revoked, would it be practicable to provide for the sewage satisfactorily?

In reply to your first question, I have to say that exact compensation, etc., effective at all points along the line of navigation, is probably impracticable; but I am decidedly of the opinion that substantial compensation, involving no material loss to any interests, navigation or other, is entirely feasible. The obstructions might be, for the most part, simple dikes or embankments, not expensive in character, supplemented in places by movable obstructions of no great extent. Such obstructions in the Niagara river would raise the levels of lakes Erie, St.Clair, Huron and Michigan, and the St. Mary river below the falls, not precisely in the same proportion as the lowering resulting from the diversion, but closely enough for all practical purposes. It seems clear that the best results would be given by obstructions which would raise lake Erie slightly above its natural level, with perhaps not quite full compensation in Huron and Michigan. Since the effect on any of these lakes of withdrawing the additional amount of water would be only about 4 inches, it seems probable that compensation could be effected to within an inch, by the obstruction suggested. Similar works at the principal rapids in the St. Lawrence river would maintain the natural levels of that river at all points above Montreal, and of lake Ontario.

In reply to your second question, I am of the opinion that the constructions proposed can be provided as rapidly as required.

In case of the revocal of the existing permit, as contemplated by your third question, it would be necessary to discharge the sewage directly into the river and lake, which course experience has shown to be dangerous. The works necessary for the purification of the sewage to such a degree that the effluent discharged into the river and lake would be harmless would require several years to construct.

Very respectfully

Alfred Noble

Consulting Engineer

REPLY ON BEHALF OF CANADA

IN THE MATTER OF THE APPLICATION OF THE SANITARY DISTRICT OF CHICAGO FOR A PERMIT TO DIVERT NOT TO EXCEED TEN THOUSAND CUBIC FEET OF WATER PER SECOND FOR SANITARY PURPOSES FROM LAKE MICHIGAN

To the Honourable HENRY L. STIMSON
Secretary of War

SIR:—Replying to the brief, or suggestions, in behalf of the Sanitary District of Chicago filed by John C. Wllliams, Esquire, Attorney for the Sanitary District, it is respectfully submitted:—

That, while professing to confine himself as closely as possible to the suggestions conveyed in the course of the hearings before you, that the sole purpose of the enquiry was to decide whether, or not, the interests of navigation would be substantially affected adversely by the granting of the permit, the learned Counsel departs widely from this ground and dwells at great length upon the needs of Chicago with regard to sanitation. Indeed he seems to treat the question of injury to navigation very lightly, as if it were of but slight importance, instead of being, as it is, the sole question which you are called upon to determine on this application. It is not, as the learned Counsel for the Sanitary District suggests, that the protection of navigation interests would be rendered MORE profitable, but it is because navigation interests will not only be rendered enormously LESS profitable, but, that great expenditures amounting to over $18,000,000, at least, on the Canadian side of the line, will become necessary to restore the lost depths in Canadian harbours,—including the great national port of Montreal, the the ship channel and the Canadian canals—that it is urged in behalf of the Canadian government, that the proposed diversion will be productive of material injury to navigation interests on the Canadian side of the boundary. It goes without saying that navigation interests on the United States side of the boundary will suffer injury in like manner, but, admittedly, to far greater extent in respect to the effect on shipping. It is abundantly clear that the navigation interests of both countries are not only seriously threatened by the proposed diversion but have already sustained material injury by the reduction of the levels of the great international waterways system. This is manifest from the expert evidence of competent witnesses on both sides of the line including the United States Corps of Army Engineers, and the technical officers of the Canadian Government, as well as many eminent private engineers whose statements are before you.

By the Federal constitution, navigation is confided to Congress, hence it is submitted, the Legislature of the State of Illinois could not legally authorize the diversion of the waters of lake Michigan, the effects of such diversion being manifestly productive of material injury to navigation.

In the absence of legislation on the part of Congress authorizing the diversion of the waters of lake Michigan it is submitted, that, unless the Sanitary District obtains a permit from the Secretary of War authorizing such diversion, under section 10 of the Act of Congress of March 3, 1899, by which the Secretary of War is given jurisdiction over the navigable waters of the United States, it is contended, that the claim set up in the brief of the attorney for the Sanitary District that they are entitled to use the waters of lake Michigan as a matter of right, is not well founded.

The jurisdiction of the Secretary of War extends over all navigable waters of the United States and any injury to navigation within the territory of the United States is cognizable by him, so that, if the lowering of the levels of the waters of lake Michigan and boundary waters within United States territory be productive of material injury to navigation, it is a matter that comes within the jurisdiction of the Secretary of War. That the lowering of the levels of the lakes, connecting channels, and canals, entailing heavy permanent losses to navigation interests, will occur as a direct result of the proposed diversion, is established beyond question in the brief filed on behalf of the Canadian Government and in the other statements filed on the part of Canadian interests, as well as by the International Waterways Commission report, and the report of the United States Corps of Engineers which is signed by General W. H. Bixby, Chief of Engineers, United States Army, dated January 23, 1911, wherein it is stated "As the water which is at present being diverted from the lake appears to have already seriously affected the navigation of its harbours and connecting waterways, prompt congressional action is recommended to limit the diversion."

It is not the desire, nor is it the intention of Counsel for the Canadian Government to reiterate the arguments put forward in the brief filed by him on the 27th of March, nor to repeat anything that was urged, orally, on that occasion in opposing the granting of the permit asked for. This reply will be confined as nearly as possible, to dealing with new matter and answering statements made by the Counsel for the Sanitary District in his brief filed since the last hearing. At the same time reliance is placed upon the accuracy of the statements of fact and inferences drawn therefrom, as well as the general conclusions reached, as set forth in the Canadian Government's brief. The statements herein put forward are to be treated as supplementary to the brief already filed on the part of the Canadian Government.

Counsel for the Sanitary District, in several places in his argument, endeavoured, in substance, to show that the jurisdiction of the Federal Government is limited to the effects which the withdrawal of water from lake Michigan through the Chicago river will have upon navigation in that river. He contends that, therefore, all that is asked in the application now pending, as well as in former applications, is permission to draw water through the Chicago and Calumet rivers, and that the Sanitary District has a perfect right to draw without permit any quantity of water from lake Michigan which it may please, through channels other than the Chicago river.

We strongly protest against the assumption of any such right by the Sanitary District because the withdrawal from lake Michigan of water through any channel and the diversion of the natural flow of the Chicago and Calumet rivers to the Mississippi instead of to lake Michigan, have precisely the same effect of lowering the level of lake Michigan and, consequently, to lower lake Huron and all other boundary waters between Sault Ste. Marie and the tidewaters of the St. Lawrence; and, thereby, to affect adversely the navigation interests of both the United States and Canada throughout the whole extent of these waters. To that extent, such withdrawal is a violation of the Treaty of 1909.

The permit of May 8, 1899, recites that, whereas, the Sanitary District had been granted permission by the Secretary of War to enlarge the Chicago river so as to secure a flowage capacity of 300,000 cubic feet per minute, "it being intended to connect the said artificial channel (from Chicago to Lockport) with the west fork of the South branch of Chicago river at Robey street," the Secretary of War "hereby gives permission to open the channel constructed and cause the waters of Chicago river to flow into the same".

The permit of April 9, 1901, reduces the permitted "discharge from the river into the drainage canal".

The permit of December 5, 1901, increases the discharge permitted during certain hours of the day.

The permit of January 17, 1903, gives "permission to increase the flow through the Chicago river" until March 31, 1903.

The water pumped at Wilmette flows down the North branch of the Chicago river to its confluence with the South branch and thence along the channel of the latter to the head of the Drainage canal at Robey St. The water pumped at the 39th Street pumping station flows by the South branch of the Chicago river to the head of the Drainage canal at Robey St.

It is submitted that the permit of May 8, 1899, is the basal authorization for all diversions; that it authorizes the opening of the Drainage canal at Robey Street; that it distinctly applies the name "Chicago river" to the channel from lake Michigan to the head of the Drainage canal at Robey street; and further, authorizes the discharge into said canal of a specified amount of water. Later permits are simply modifications of the amount of water authorized to be discharged into the canal.

Counsel argues that the discharge from the Wilmette and 39th Street pumping stations, the water pumped for domestic water supply and, inferentially, any other flowage not discharged into the Chicago river below the confluence of the North and South branches, do not come within the purview of the above mentioned permits. It is submitted, that this argument is absolutely untenable. It is further submitted that the discharge of the Sanitary canal at Lockport can not legally exceed the amount authorized by the Secretary of War.

The fact that the permits heretofore granted specifically guard the interests of navigation in the Chicago river, does not preclude navigation interests elsewhere which are adversely affected by the diversion through the Chicago Drainage canal from protesting against the granting of the permit now asked for. It was only when it was found that the diversion already permitted was reducing the levels of the Great Lakes and connecting channels and canals, thereby causing material injury to navigation, that navigation interests on both sides of the border acting with a common impulse but without any preconcerted arrangement, joined forces in vigorous protest against the granting of the present application.

As far as Canada is concerned in the question of joining in the concerted opposition to the proposal, it may be stated that this is the first occasion on which she has been invited to express her views. All previous permits were granted without reference to Canada. It is not in accordance with the facts to state that this concerted action is due to the unusual low-water conditions of the past season. On the contrary, it is due to the request of Chicago for more water. Against the unanimous action on the part of navigation interests, supported by the Dominion Government and buttressed by unquestionable data from unimpeachable sources, in protesting against any further diversion of the waters of lake Michigan because of the injury to navigation, we have the bald statement of Counsel for the Sanitary District that "the objection to the granting of the permit made by those who are interested in lake navigation is based upon fears for which there is no basis, and upon speculative theories that up to this time have not been demonstrated to be of practical force."

Referring to the statement of the learned Counsel for the Sanitary District that Counsel for Canada admits that lake Michigan is not included within the definition of boundary waters as contained in the treaty, attention must be called to the various other references which were made during the hearing by Counsel for Canada, in which that admission was very much qualified, and a reservation of Canada's rights to have the question referred to the International Joint Commission was made by Counsel for Canada, not only in his oral statement, but in his brief filed with you.

Dealing with the rights of the Dominion of Canada under the Treaty of January 11, 1909, Counsel for the Sanitary District observes that "so far as the Government of Canada is concerned, it is expressly precluded from entering any protest in this proceeding."

Whether or not lake Michigan may be considered a boundary water within the definition of the treaty, it cannot be questioned that the right of navigation of lake Michigan is conceded to Canada while that treaty remains in force. If, therefore, the right of navigation of lake

Michigan on the part of Canada is obstructed in any way, as for instance by the diversion of waters from lake Michigan through the Chicago river causing an increased current and thereby rendering navigation of the Chicago river hazardous, Canada would be entitled to enter a protest. If lake Michigan is a boundary water, or might so be considered under the spirit of the treaty, Canada would not be debarred from protesting against the proposed diversion, since, as it is submitted, that, by the true construction of Article VIII of the treaty defining the order of precedence, "uses for domestic and sanitary purposes" means "ordinary use." To hold that these words mean an extraordinary use such as the diversion at Chicago through the Drainage canal causing an irreparable loss to navigation, would defeat the object of the treaty which was the protection of boundary waters, while, in the first place, recognizing the right of either country to the ordinary use of boundary waters for domestic and sanitary purposes, and, secondly, "uses for navigation, including the service of canals, for the purposes of navigation." If by the first use for domestic and sanitary purposes it was contemplated that such a diversion could be made as would seriously impair navigation, it would be a violation of the spirit of the treaty.

Counsel for the Sanitary District goes so far as to state that "if the right of citizens of Canada to navigate lake Michigan should be exercised by those citizens to the detriment of sanitation, and such use should interfere with the use of the waters of lake Michigan for domestic and sanitary purposes, then the Government of Canada would be guilty of violating the terms of the treaty." It seems unnecessary to reply to such an extreme and unwarranted statement; but, as Counsel has devoted considerable space to this point, it may be well to state that, while priority in the use of waters is set forth in the treaty, yet it was never intended that this priority was to work injustice to other legitimate users of the waters.

Counsel's argument is, in brief, that the treaty of 1909 permits the unlimited diversion of water so long as it is required for "domestic and sanitary purposes." The logical deduction, therefore, is that, if so required, the whole flow of lakes Huron and Michigan could be diverted and the St. Clair river dried up—the *reductio ad absurdum.*

The principle affirmed in Article III is, that there shall be no uses, obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line except by the authority of either country within their respective jurisdictions. Exceptions are made in favour of governmental works for the benefit of commerce and navigation, provided such do not materially affect the level or flow of the boundary waters on the other side. Here, again, the principle of maintaining the levels of boundary waters is apparent.

And finally we have the concluding clause quoted by the learned Counsel "nor are such provisions intended to interfere with the ORDINARY USE of such waters for domestic purposes." What waters are here referred to? The answer is clear and simple: boundary waters. Yet Counsel for the Sanitary District endeavours to draw a distinction between the use of boundary waters for domestic and sanitary purposes as contained in the final clause of Article III, and the use of boundary waters in Article VIII, wherein the object is only to give the order of precedence in the several uses of boundary waters. It is respectfully submitted that Article III explains the meaning of the words in Article VIII, giving precedence to the "uses of boundary waters for domestic and sanitary purposes" and clearly shows that such uses are only "ordinary use."

To put the construction contended for by the learned counsel on Article VIII, and to hold that "uses for domestic and sanitary purposes," leaves such uses unrestricted, would be contrary to the letter and spirit of the treaty; whereas the use of boundary waters as provided for in the concluding clause of Article III, that is to say, "ordinary use" puts a reasonable construction on the language in Article VIII. Then again, the first mention of the use of boundary waters for domestic and sanitary purposes in the treaty is in Article III, and the words there employed, "ordinary use," show unmistakably what the framers of the treaty had in mind in giving precedence to the use of boundary waters for domestic and sanitary purposes in Article VIII. In other words, Article VIII does not enlarge the clearly expressed definition of the use of boundary waters for domestic and sanitary purposes in Article III, i.e., *ordinary use.* No significance can be attached to the omission of the word "ordinary" in Article VIII. The extent of the use had been already defined in Article III.

The foregoing is sufficient to demonstrate that the treaty contemplated only the "ordinary" use of water for these purposes and had reference to its abstraction by pumping for domestic and sanitary use and contemplates its use as a diluting agent when sewage is discharged into it. Additional weight is lent to this contention by the last paragraph in Article III above quoted. However, a discussion of this branch of the case is not really pertinent to the question you have undertaken to determine.

The Boundary Waters treaty was conceived with the express purpose of conserving the integrity of the levels of the Great Lakes. It was not an object of the treaty to establish the priority of agency by which these levels might be disturbed, but rather than when once it has been decided by both countries that certain usages of water were for the common and general good, then the treaty provides for the priority of those uses. Any use of water, therefore, must, itself, first be approved and sanctioned by the two countries party to the treaty.

From the learned counsel's argument it would appear to one unfamiliar with the circumstances, that the Sanitary District was already, in the possession of rights under the treaty of 1909, to make the diversions in question. A wholesale diversion of water, such as is proposed by the Sanitary District, is a question which must be decided by the proper tribunal before any ground for considering priority of use would be created.

The learned counsel, on the theory that lake Michigan is not a boundary water as defined in the treaty of 1909, contends that Canada has not a "right to have a voice" in the manner in which the waters of lake Michigan should be used for domestic and sanitary purposes. Canada, however, declares that she has treaty rights in respect to diversions from lake Michigan because such diversions directly affect boundary waters. Diversions from the lower end of lake Michigan mean the taking away of waters which in their natural channels, would flow into boundary waters, and this taking away of such waters materially affects lake levels and results in serious injury to navigation and other interests on the Canadian side of the boundary. Indeed, this is also the ground taken by the special Board of Engineers under the chairmanship of Brig.-Gen. W. H. Bixby. In its report of January 23, 1911, to the U. S. Secretary of War, this Board states:

"The future diversion of water from Lake Michigan for any purpose is fraught with difficulties. *Not only has Canada an interest in the maintenance of lake levels which the United States must recognize*, but every foot of water flowing through the Chicago Drainage canal lessens the flow at Niagara Falls and at the power sites along the St. Lawrence river"

The learned Counsel states that:
"the Canadian government had full notice of the fact that the waters of lake Michigan were, at the time of the signing of the treaty, being used for the purpose of diluting the sewage of the city of Chicago; and they consented that no provision of the treaty should interfere with that use."

This allegation might have some force if the present application had reference to the limited use referred to. But it can be of no avail on an application for a largely increased amount, and, on such an application, in view of the restricted scope of the discussion as defined by you, Mr. Secretary, it is unnecessary to enter into any argument regarding the limited amount that might ultimately be found necessary.

Appendix "B" of the brief of Counsel for the Sanitary District quotes sections 19 and 43 of the report of the International Waterways Commission, and the argument has been advanced that this report constitutes a joint recommendation on the part of the Governments of Canada and the United States that a withdrawal of 10,000 cubic feet of water per second through the canal should be permitted.

Counsel for Canada contends that, inasmuch as it is a purely advisory body, no recommendations by the International Waterways Commission can bind either Government and that no such recommendation has been adopted by either.

II

In the section of the brief submitted by Counsel for the Sanitary District which deals with the disposal of the sewage of Chicago the essential features of the argument are:—

(1) That there is no known method of sewage treatment which, if applied to Chicago, would make the effluent fit for being discharged into lake Michigan near the intakes of the water works.

(2) That, therefore, the dilution method adopted for the treatment of the sewage of Chicago is the only feasible one at present known.

(3) That the 10,000 cubic feet of water per second now applied for by the Sanitary District is the least quantity by which the sewage of Chicago and its suburbs can be properly diluted and made fit for being discharged through the Drainage canal into the Illinois river.

With respect to the first contention, we reply that we have nowhere asserted or requested that the sewage of Chicago should be purified to such extent as to be fit for being discharged into the lake and thus mixed with the supply for the waterworks.

We have simply asserted and maintained not by opinions, but by examples, cited, that the purification of sewage to such extent as to be non-putrescent and non-offensive, and thus made fit for being discharged into the Drainage Canal and into the Illinois river, is entirely feasible.

The reports of the sanitary engineers upon the treatment of Chicago sewage, which we have quoted, bear us out in this contention.

The learned Counsel himself, in his brief, admits that Chicago is so situated that it is possible by a combination of partial purification and dilution methods to dispose of its sewage without offence to any one and with perfect safety to its water supply. It is a comparatively simple and inexpensive matter to partially purify sewage.

The dilution method, or, more accurately, the power producing method, chosen by Chicago—and the one to which it so strenuously adheres—is not the combination of partial purification and dilution, which Counsel and the experts of the Sanitary District admit to be quite feasible. It consists in taking the raw sewage of a prospective population of three millions, including the largest part of the industrial wastes, and demanding water enough to convert it into an innocuous stream of vast volume which is to be used for the generation of power estimated by Mr. Hering at 47,300 horse-power, and then discharged into the Illinois river. It is the abstraction of this enormous quantity of water in utter disregard of navigation and other interests, to which we object, and for the reasons set forth in our former brief.

Counsel cites the case of Worcester, Mass., as one in which the treated effluent is unfit for domestic use and remarks that, if the intermittent filtration there used were adopted at Chicago, the cost of obtaining the necessary land and preparing filter beds would be so enormous as to make it prohibitive. The deductions thus drawn from the Worcester example are entirely irrelevant, because the conditions at Worcester and at Chicago are quite different, and the method which is suitable to one is not suited to the other.

The eminent engineers Mr. Hering and Mr. Wisner in their reports show that the sprinkling system is that which is suitable for Chicago, and that it can be installed and operated at a moderate cost.

Mr. Wisner even goes so far as to indicate suitable sites by saying that "the sites available are to the north of the junction of the North Shore channel with the North branch of the Chicago river, near Lawrence avenue, on the flat tract of land which exists there. On the west side, sites seem to be available to the east of the old Ogden dam, and both north and south of the Main channel. Pumping would have to be resorted to in any case. On the south side, available sites in the Calumet region are many."

As regards the case of Manchester, England, quoted by Counsel, he reiterates the remark that the effluent must be dangerous to discharge into lake Michigan near the intake of the Chicago water supply. This is altogether beside the mark; the case really furnishes convincing proof that the very concentrated sewage of a large city is successfully treated to such extent as to be discharged into a much used navigation canal, not only with no bad results, but actually to improve the quality of water. This is exactly what is needed in the case of the sewage of Chicago which is to be carried off by its Drainage canal.

It is recognized in the reports of the experts referred to, and in Counsel's arguments, that the dilution method of disposing of the sewage of Chicago is inefficient, inasmuch as it permits the deposition of enormous quantities of putrescent sludge in the Chicago river, along the Drainage canal, and in the Desplaines and Illinois rivers; and that screening and sedimentation must be adopted to remedy this serious defect. Also, that the industrial wastes must be specially treated.

Thus, the permit of January 17, 1903, expressly states that the extra water is granted "*in order to carry off the accumulations of sewage deposit which line the shores along the said city.*"

This admits the principle that some treatment of the sewage is needed to supplement the defects of dilution and it logically follows that further treatment, as carried out in other cities, would make the effluent fit for discharging, by way of the canal, with little or no dilution.

Counsel objects to purification of Chicago sewage on the ground that a purification plant is less efficient in winter than in summer, and quotes Columbus, Ohio, as a case in point. He says "that the climatic conditions in and around Chicago would be decidedly inimical to the efficient operation of any purification plant"; but all that he adduces in proof is that purification processes are less active in extreme cold weather than in summer, and quotes the Columbus plant as his example. The learned Counsel is quite wrong upon this point. Mr. Wisner, chief engineer of the Sanitary District, in his report on the "Disposal of Chicago Sewage," makes statements in direct contradiction to the contentions of Counsel. He says:—"From experiments carried on at the Thirty-ninth street testing station it is evident that, with sewage largely domestic and well prepared by settling, a yield of 2½ to 3 million gallons per acre per day may be expected with a bed of stone 1¼ to 2 inches in size, and 6 to 7 feet deep, and that the effluent will be stable for the greater portion of the year.

"Covering the filters will make a marked difference under any condition, causing the filter to deliver an effluent higher in nitrates during the winter months, and also nonputrescible. It is doubtful, however, whether it is necessary in the immediate future to cover filters, as satisfactory results can probably be obtained with open filters under weather conditions in Chicago. Even if the effluent is not as stable in the colder weather, the higher content of oxygen in the cold lake water will more than take care of the difference in the stability of the effluent."

Counsel draws attention to the terms used in our brief describing the purification plant at Baltimore, which implies that that plant is in actual operation. We are glad to correct the implication, and to explain that the language does not assert, and was not meant to imply, that the works are actually in operation, but simply that the effluent from the sprinkling filters necessarily well purified, will be further treated in order to completely sterilize it.

It may however, be added that the example loses neither force nor fitness by the correction, for it still shows that Baltimore has deemed it feasible and wise to both purify and sterilize its sewage, for the preservation of the life and health of its inhabitants and to keep wholesome its Chesapeake Bay oysters, and it, therefore, cannot be considered either impracticable or unreasonable to require that Chicago, for the preservation of the life and health of its citizens, shall instal partial purification plants at the sacrifice of some of its power production works.

III

In view of the fact that counsel for the Sanitary District has thought fit to give a brief historical sketch of the conditions at Chicago, prior to the initiation of the Drainage Canal scheme, a few additions to the sketch may be pertinent:

In 1882, the United States granted a right of way through the public lands and, in 1827, made a grant of land to the State of Illinois to aid "in opening a canal to connect the waters of the Illinois river with those of lake Michigan." Work was commenced in 1836 and, in 1848, the canal was opened from the Chicago river at Bridgeport to the Illinois river at La Salle. The summit level was eight feet above lake Michigan, (low water of 1847, Chicago, datum) and, in time of drought—about 45 days in the year—received water by pumping from the Chicago river at Bridgeport.

In the late "fifties" the city of Chicago entered into an agreement with the canal authorities whereby the latter agreed to pump water all the year round, thus improving the sanitary condition of the Chicago river.

Later, a further agreement was made whereby the city of Chicago cut down the summit level. This work was completed in 1871, and 150 cubic feet per second was diverted from the Chicago river to the DesPlaines river. The difference between the summit level of the canal and lake Michigan, however, was so small that certain winds lowering the lake level, or a very heavy rainfall, would set the current in the Chicago river east into the lake.

The original land surveys show that, in times of high water, the DesPlaines river overflowed the low waterparting and discharged into the South branch of the Chicago river. The Internal Improvement Commission of Illinois, Isham Randolph, Chairman, state in their report, 1909, that "The inference is plain, that the South branch [of the Chicago river] with its two forks, was the proper outlet for the flood waters of the DesPlaines river and was maintained thereby. . . . . What occasioned the diversion down the present course of the DesPlaines river is a matter of speculation—it may have been due to silt deposits initiated by a beaver dam. . . . . The present course bears every evidence of being very recent. . . . . . In 1849, the divide was overflowed at the spring break-up (much as in 1675, when Marquette was driven from his cabin) with ice gorges and great destruction of shipping and bridges in the Chicago river."

Even in 1877, after the new dam in the Ogden-Wentworth canal was constructed, at times of high floods, 75 per cent of the DesPlaines river waters came through Chicago as they did before the dams were built. As a result, the old pumping works at Bridgeport were rebuilt.

In brief, from the opening of the canal in 1848, to 1871, an insignificant amount of water was *pumped* from the Chicago river to the DesPlaines river; from 1871, till the Bridgeport pumping station was completed, the canal diverted only 150 cubic feet per second, and, thereafter, till the present drainage canal was opened in 1900, 1,000 cubic feet per second.

Counsel for Chicago argues that the "present canal is a growth and development of the policy of both the State and Nation," and that "it is strange that after a policy has been declared and carried out for a period of ninety years, there should be, at this late date, so strenuous an effort to prevent the protection of the lives of the people of that large community because of some supposed and imaginary injury to navigation upon the Great Lakes."

To argue that the operation of a small pumping plant for 45 days in the year raising an insignificant amount of water for navigation purposes for locks 110 feet long, 18 feet wide and 6 feet deep, justifies the diversion of 10,000 cubic feet of water per second is a somewhat unusual expansion of terminology.

Counsel for the Sanitary District is imbued with the idea that the people tributary to that district are the public and, that Canada and the opponents of the scheme are fighting for private interests. The waterways serve the public, afford them cheap rates both directly and by competing with railways; they afford the millions along their shores good drinking water and, like Chicago, a means of diluting their sewage, not however by throwing the water away, but by leaving it in the drainage basin.

There should be a distinction between the public of a municipality and the whole country. If, by dredging, or placing obstructions in the outlets of the lakes, the levels have been changed, the work was undertaken by the Government representing the whole people, for the benefit of navigation and the country generally. The Government is the one authority that may do as it pleases; the people of Chicago are only a portion of the whole and may do only what the whole permits.

All works carried out by the Federal Governments have been for the benefit of the general public rather than for any locality or private interest, by making it possible to build larger and more economical freight carriers, always with a view of attaining cheaper transportation of food and other supplies necessary for the comfort and welfare of both nations.

Counsel says, "We deal, however, not with future conditions which are uncertain and indefinite, but with actual conditions which exist now; and so long as they do exist, the necessity is imperative that lake Michigan, the great storage basin provided by nature for the comfort and convenience of man, shall be used to promote the health and comfort of those who may avail themselves thereof."

If all lake cities could, and did, use the lakes as Chicago does, the unparalleled system of inland waterways would be utterly ruined.

The learned Counsel for the Sanitary District renews his argument "that transportation companies must accommodate themselves to the natural conditions regarding fluctuations in lake levels," and contends that this argument in that respect is not fallacious. But no one makes any objection to the argument as stated in the above quotation. The objection applies to the fallacious contention that, navigation interests can afford to ignore any artificial aggravation of the troubles arising from natural conditions, and it is sheer folly to submit to the serious consideration of any tribunal a suggestion that, because, in the course of business, one loses any valuable commodity in a considerable variety of ways, he will not be prejudiced by any additional loss.

Since the culmination of a "high" cycle in the "eighties", the level of the Great Lakes has fallen below the average level that obtained prior to that period, and a critical examination of the gauge readings demonstrates that we have entered upon an era of distinctly lower levels. It is not possible to allocate to deficient precipitation, development operations and causes other than the Sanitary canal, the proportion due to each. But, in the case of the Sanitary canal, no such difficulty exists. The amount abstracted, instead of being inappreciable on account of the extent and variety of other losses, comes, in fact, as a very serious aggravation of the trouble.

The accompanying profile shows, diagrammatically, the actual effect upon the gauge heights of lakes Michigan, Huron, Erie and Ontario, assuming that the full effect of the diversion of 7,000 cubic feet per second has been experienced during the years 1909, 1910 and 1911. The *bottom* of the solid black indicates actual gauge readings during these years, while the *top* indicates what the gauge readings would have been but for the 7,000 c.f.s. diversion. If 10,000 cubic feet per second had been diverted, the gauge heights would have been reduced to the bottom of the red band.

It is necessary however, to point out the complete inaccuracy of the statement submitted by Counsel as the foundation for his examination of the calculations of the losses suffered by transportation companies. He states that "The only vessels now sailing the Great Lakes which could be affected by any variation in lake levels of from 3 to 5 inches are owned and operated by the ore-carrying companies, particularly the Pittsburg Steamship Co., which is a subsidiary Company of the United States Steel Corporation."

This statement is simply not true, and doubt is thrown upon the accuracy of the information in the possession of the Sanitary District with reference to lake navigation.

The truth is that every vessel mentioned in connection with the statements submitted on behalf of the Dominion

Marine Association and the Shipping Federation of Canada, is, at least in periods of low water, seriously affected by "variations in lake levels of from 3 to 5 inches." If they are loaded at the head of the lakes for Georgian Bay ports or Goderich, Point Edward, Port Colborne or Buffalo, they feel even such a slight variation at once, for the permitted draught of water at the Canadian canal at Sault Ste. Marie, at the opening of navigation, in the coming season is to be only 17 feet 5 inches for up-bound vessels and 17 feet 10 inches for those down-bound. If they are loaded for Kingston or Montreal, they feel the loss of even an inch of water at the Welland canal, or if not, then at the Rapide Plat in the St. Lawrence river or at some one of the various St. Lawrence canals. The same statement applies, not in theory, but in fact, to every vessel that finds occasion to enter a harbour of limited depth anywhere on the lakes or river. Ocean tonnage, again, feels the loss in the same way, and reference must be had to the statements submitted on behalf of the two Canadian Associations mentioned as well as what was said by Counsel for those bodies at the hearing in Washington on the 27th March last. These statements, it is submitted, are not at all met by any such methods as those adopted in the brief submitted for the Sanitary District.

The brief in question proceeds to state "that the profits of transportation companies depend, not upon the depth of water but upon the amount of freight carried," and "that it is not and cannot be truthfully contended that any freight has not been carried by reason of lack of water which would otherwise have been." In answer, it is submitted that the remarks above quoted are so far removed from being statements of fact that they scarcely require contradiction. To take only one concrete case, the Canadian steamer "E. B. Osler" which could carry, three or four years ago, something over 10,000 tons of coal per trip, could, and did, in 1911, carry only something over 8,000, thus losing *not in imagination or theory, but in fact,* about 2,000 tons per trip with corresponding loss in earnings. It is an uncontroverted fact that vessels were forced to go down the Welland canal last year under restrictions as to draught, and were even turned back by canal officials to unload cargo at Port Colborne when drawing an inch or two too much. It is also an uncontroverted fact that boats ran the St. Lawrence at 12 feet and some inches draught which should have carried, and desired to carry, 14 feet, and that they were required on occasion, to go back and take out cargo at Prescott before being permitted to proceed. It is an uncontroverted fact that loss and inconvenience were suffered by ocean tonnage in the river below Montreal, and, in the face of these facts, the statements and arguments in the brief for the Sanitary District are futile and worse than useless.

It is also useless to contend that, in periods of high water, the loss due to the action of the Sanitary District may not be felt, for that is not the question immediately at issue, and it is utterly absurd to contend that no one has yet made the slightest claim up to this date, that navigation has been impaired by the operation of the Sanitary District canal; for we are dealing with existing conditions and every complaint that has been made, has applied to every inch of loss already suffered, and, it may be added, that all engineers agree, that, in periods of low water, the loss in level for a given withdrawal of water is very much greater than at times when the water is high.

In the brief submitted by Counsel for the Sanitary District, attention is drawn to a supposed discrepancy in the figures used to show the loss of depth at the Rapide Plat by the International Waterways Commission, and those submitted by the representatives of Canada. The figures submitted for the Dominion of Canada were computed for periods of *low water* whereas those quoted from the report of the International Waterways Commission were calculated for *mean water*, a fact apparently ignored, or overlooked, in Counsel's brief where comment is made on the difference between these figures and other expert estimates. The figures submitted for the effect of the diversion at Montreal have been obtained from the best information now in possession of the Government Departments. This information has been acquired by direct flow measurements made since the publication of the report of the International Waterways Commission mentioned.

Counsel quotes "from chart No. 2483 of the Canadian Government charts of the Harbour of Montreal." This chart has not been published by the Canadian Government, and the figures cited by Counsel do not correctly show the depths which govern the navigable draught in Montreal harbour. The latest chart of this harbour shows 30 feet in the channel approaching the piers and 29 feet alongside the wharves. It was dredged to what was considered a safe depth for a certain draught. If it be reduced by six or twelve inches, there can be no question that the efficiency of the harbour is greatly impaired.

Counsel states that:

"According to the Forty-third Annual Report of the Department of Marine and Fisheries of Canada of 1910 the total expenditure on the improvement of the St. Lawrence river, since 1851, by all public appropriations, has been $11,400,000. This is practically the amount that has been expended by the Sanitary District alone in the improvement of the harbour facilities in the Chicago river.

"Navigation interests represented by a government that has expended in their behalf less than one-sixth of the money expended by the Sanitary District for health and sanitation should not expect their protests to be seriously considered."

Counsel is under a misapprehension in this regard, as the amount referred to applies only to the improvement of the St. Lawrence Ship channel below Montreal prior to 1910, whereas the expenditure incurred by the Canadian Government, up to the end of the fiscal year 1910-11, on the St. Lawrence above Montreal in canal works, dredging of channels, harbours, &c., amounts to $52,000,000. To this amount, must be added $20,000,000 expended on Montreal Harbour works, and $13,436,000 on the River St. Lawrence Ship channel below Montreal.

This makes a total expenditure of $85,436,000 incurred by the Canadian Government for the improvement of navigation on the St. Lawrence river between lake Ontario and Quebec.

In addition to the above amount, $36,881,000 have been expended on the Welland canal, $5,631,000 on the Sault Ste. Marie canal, and $21,000,000 on dredging and harbour works on the Great Lakes, making a grand total of $149,000,000 expended on works that are adversely affected by the diversion at Chicago.

As the improved St. Lawrence river and canals are entirely free to shipping interests on both sides of the boundary, most of this expenditure has been of benefit to both countries. Splendid results have been obtained by these improvements to the comfort and welfare of the citizens of both countries, but, on a system of navigation like the St. Lawrence, every inch of water in depth counts, and must be saved. Is this system which is utilized by both nations now to be impaired by the tapping of its source of supply, and by allowing part of this supply to be diverted to another valley to further the schemes of a city which should use some other means of disposing of its sewage?

Compensating works: Counsel submits a letter from Mr. Alfred Noble, of New York, on the subject of compensating works, but this contains no positive statement that they can be so constructed as to be effective. Such works should only be a possible remedy to be applied in extreme and absolutely unavoidable cases. Their enormous cost, *which must be borne by the Sanitary District*, the international difficulties involved, the numerous important interests that would be adversely affected, and other similar conditions, demonstrate the practical impossibility of ever constructing such works for conserving the levels of the Great Lakes. In addition, as stated in the report on Regulation of Lake Erie by the International Waterways Commission, works that would regulate the levels at, or near, some fixed stage would be so detrimental to the lakes and rivers below as to be inadmissible.

Replying to Counsel's statement that:

"It may be here observed that a protest from the Dominion of Canada against the lowering of lake levels comes with rather poor grace. It is a matter of record, in your Department, that, during the improvement of the Detroit river in the construction of the Livingstone channel, the United States Government sought to maintain the level of the lakes by the construction of remedial works on the Canadian side. A protest was entered on behalf of the Canadian Government, and these remedial works have not been constructed as was planned by the United States engineers."

This statement ignores the fact that the Government of Canada, in an Order in Council dated 11th January, 1911, recommended that, in view of the very strong protests made by municipalities on the Canadian shore, further investigations should be made regarding the matter. It was further suggested that probably the whole subject would be better dealt with by the International Joint Commission.

Reference is made to the fact that "from May, 1911, when lake Superior was at its lowest stage for the year, it had risen so that on January 1st of this year it was practically one foot and three tenths higher than in May, 1911. During the same period lake Michigan has only risen about two tenths of a foot." It is argued by the learned Counsel that this is due to the obstructions in connection with the construction of the new Soo locks, and that, but for this interference with the flow, lakes Michigan and Huron would have been in the neighbourhood of three inches higher at the present time than they are. In reply, it may be stated that this obstruction was placed in the St. Mary river about two years ago, but its effect on the lower lakes could be only temporary. By the present time, the natural outflow from lake Superior has been re-established and levels in lakes Huron-Michigan restored.

Counsel for Chicago states that nearly 11½ million dollars have been expended in improving the Chicago river and urges that "this is an ample guarantee that the Sanitary District is safeguarding the commercial interests of the port of Chicago, and is doing all in its power to see to it that navigation will not be interfered with nor the interests of her Canadian friends injuriously affected."

The learned Counsel centres attention only upon the port of Chicago. While it has been improved, it is wholly outside the mark to argue that "the grand total of the sums of money" expended by the Sanitary District at the port of Chicago is a proof that Chicago's "Canadian friends" are not being "injuriously affected". The statements already made before the Secretary of War, on behalf of the Government of Canada, and the Dominion Marine Association, and other Canadian interests, show that the diversions by the Sanitary District of Chicago do cause, throughout the whole extent of the St. Lawrence system, serious injuries to navigation, and other Canadian commercial enterprises.

Conclusions

We respectfully submit that it has been abundantly shown:

(1) That there is no imperative necessity for such a large diversion of water from lake Michigan for sanitary purposes, as is requested in the application.

(2) That the historical facts presented in this brief show conclusively that the Sanitary canal can not be considered as the outgrowth and development of a scheme which has received recognition by the United States Government, or that of the Dominion of Canada.

(3) That the claim that the Sanitary District is entitled, as a matter of right, to the use of so much of the waters of lake Michigan as may be necessary for sanitary and domestic purposes, cannot be entertained in so far as it relates to the extraordinary and wasteful use proposed.

(4) It has been shown that very substantial injuries have been made, and are being suffered by navigation interests. Fears for future and more extensive damages, by reason of increased diversion, are exceedingly well founded, and justify the demand that some improved method of sewage disposal, which shall not require the abstraction of any considerable quantity of water from lake Michigan nor the diversion of other outlets of waters which would naturally flow into it, be adopted.

(5) That the Dominion of Canada has the right to a voice in the disposition of the waters of lake Michigan for sanitary purposes in so far as such diversion injuriously affects navigation, because her citizens are accorded, by treaty, the right of free navigation in that lake, and, in that no diversion can be made without injuriously affecting her harbours, channels and canals.

(6) It having been shown that the sewage of Chicago can be so treated and disposed of by other means than the present dilution methods, by which great quantities of water are withdrawn from lake Michigan and discharged through the Drainage canal into the Illinois river, it is contended, on behalf of Canada, that the abstraction of water from lake Michigan shall be limited to such quantity as shall not injuriously affect navigation interests on the Canadian side of the boundary, and, that such limitations shall take effect at the end of such time, as, in your judgment, may be reasonably necessary for the Sanitary District to instal, and put into use, the works which may be required for disposing of the sewage by other means than by the dilution method now in use.

(7) That, in view of the fact that the Sanitary District claims that permits hitherto issued deal only with the flow

through the lower portion of the Chicago river, and that it has the right to take any amount of water, without permission, through the canal, provided it is supplied through other feeders, it is respectfully requested that all permits be only for such limited quantity of water as shall not injuriously affect navigation on the lakes and the St. Lawrence river, and be so worded as to state the total quantity which the Sanitary District of Chicago may be permitted to withdraw for domestic and sanitary purposes from the drainage basin of lake Michigan.

We feel confident that the interests of humanity at Chicago, and the levels of the Great Lakes, and of the St. Lawrence river, can best be protected by the installation of a modern system of sewage disposal, rather than by using a method which has been shown to be injurious to the navigation and commerce of both nations, and, further, that the interests of the public generally will, thus, be protected and their welfare promoted.

Respectfully submitted

Daniel Mullin, K.C.,
Counsel
John Kennedy
Consulting Engineer
A. St. Laurent,
Assistant Deputy Minister
Public Works, Canada
Wm. J. Stewart,
Chief Hydrographer
V. W. Forneret
Superintending Engineer
St. Lawrence Ship Channel
Representing the Government of Canada

APPENDIX A

OTTAWA, CANADA, February 21st 1912

DEAR SIR:—Kindly inform the Prime Minister that I have this morning received the following telegram from the Chief of Engineers of the United States Army:—

"Advise all interested parties that Secretary of War will give "hearing at ten-thirty morning of twenty-eighth instant upon application of Sanitary District of Chicago for diversion of ten thousand "second-feet from lake Michigan."

I am

Yours very truly

LAWRENCE J. BURPEE Secretary

P.S.—I have informed the Deputy Minister of Public Works, and have also wired Hon. Adam Beck and Sir Lomer Gouin, as both provinces are interested in the St. Lawrence River system, which would be affected by diversion at Chicago. The message is from General Bixby.

A. E. BLOUNT, Esq.
Private Secretary to the Prime Minister

OTTAWA, ONT., February 25th, 1912

The Right Honourable JAMES BRYCE
British Ambassador, Washington, D.C.

Grant of application of Chicago Sanitary District affects level of boundary waters and seriously menaces shipping on Great Lakes and St. Lawrence river. While notice of hearing before Secretary of War for Wednesday twenty-eighth was only received on Friday, still many very strong protests from important Canadian Shipping and other bodies have already reached this Government. Time, however, too short to permit of proper submission of protest. Trust Your Excellency can secure such reasonable adjournment as will allow for adequate presentation of Canada's views on this gravely important matter.

R. L. BORDEN

WASHINGTON, February 26th, 1912

PRIME MINISTER
Ottawa, Ont.

Immediately your letter received called on Secretary of War. He would have willingly postponed hearing but in view of the fact that it would be necessary to telegraph to many persons on the point of starting from Chicago today for Washington he suggests Canadian hearing should take place separately any time after American hearing. Date suggested March 13th, if agreeable to you.

BRYCE

OTTAWA, February 27th, 1912.

The Right Honourable JAMES BRYCE
British Ambassador, WASHINGTON, D.C.

Chicago Sanitary Canal.—While warmly appreciating the courtesy of Secretary of War in giving Canada an opportunity to present case on 13th March we are convinced that time thus afforded is rather short for dealing with so important a matter and earnestly request that Your Excellency will endeavour to secure further extension of two weeks.

R. L. BORDEN

WASHINGTON, D.C. Feb. 28th, 1912

PRIME MINISTER, OTTAWA

Secretary of War proposes fix Wednesday, March 27th, at 10.30, for Canadian hearings. Trust this will be satisfactory to you.

BRYCE

APPENDIX B

Certified Copy of a Report of the Committee of the Privy Council approved by His Royal Highness the Governor General on the 27th March, 1912

On a memorandum, dated 25th March, 1912, from the Minister of Marine and Fisheries, stating that he understands that the United States Secretary of War has arranged to hear argument in the matter of the Chicago Drainage Canal scheme at Washington, on the 27th March, 1912.

The Minister observes that, as the proposed works contemplate the diversion of ten thousand cubic feet of water per second from lake Michigan to the Desplaines river, the question of the effect of any such scheme on navigation in the international boundary waters, and in the St. Lawrence river, calls for careful consideration.

The Minister recommends, in order that the views of the Canadian Government may be laid before the Secretary of War, that Messrs. W. J. Stewart, Chief Hydrographer of Canada, Department of the Naval Service; Victor W. Forneret, Superintending Engineer, St. Lawrence Ship Channel, Marine and Fisheries Department; Arthur St. Laurent, Assistant Deputy Minister, Public Works Department; John Kennedy, Consulting Engineer, Harbour Commissioners of Montreal; and Daniel Mullin, K.C., St. John, N.B., be authorized to attend the meeting to be held at Washington on the 27th March, 1912, in connection with the Chicago Drainage Canal scheme, and to oppose, on behalf of the Canadian Government, any proposal which will result in lowering the level in the International Boundary waters and in the St. Lawrence river.

The Committee submit the same for approval.

Rodolphe Boudreau

Clerk of the Privy Council

APPENDIX C

THE SANITARY DISTRICT OF CHICAGO.

Chicago, February 5th, 1912

Sir,—On behalf of the Board of Trustees of The Sanitary District of Chicago, I have the honour to apply for enlargement of the terms of an instrument executed by the Secretary of War, May 8, 1899, as modified by instruments similarly executed on December 5, 1901, and June 30, 1910, respectively, in the following particulars and in view of the facts hereinafter set forth, to-wit:

The flow of water from lake Michigan through the canal of The Sanitary District of Chicago is now limited by the said instruments to 4,167 cubic feet per second.

The population of the Sanitary District, the sewage of which is to be disposed of through the channels constructed and to be constructed by the said District, exceeds 2,500,000 persons, and is rapidly increasing. The only method at present available for disposing of the sewage of this population is by diluting the same with water withdrawn from lake Michigan and flowing through the Chicago Drainage canal The least amount of water necessary to render sewage innocuous by the dilution method has been estimated by well recognized sanitary experts as 1,000 feet per second for every 300,000 inhabitants; so that the amount permitted to be withdrawn by the instruments to which reference has been made is much below the amount at present needed by the District.

The Sanitary District has been for some time engaged in investigating methods and devising plans for the treatment of the sewage with a view to requiring less water for its safe dilution in the future. The methods of other states and countries for such treatment of sewage are not as yet entirely satisfactory to all concerned, and any changes of methods for large cities must necessarily require several years.

Until these experiments are concluded and proper works installed, the use of additional water from lake Michigan is essential to the health of the large population of the city of Chicago and of the Sanitary District and of those who live adjacent to the Desplaines and Illinois rivers, into which such waters are discharged.

Subject therefore to such restrictions as to you may seem proper for the protection of the public interest, and to such a method of supervision as you may suggest to promote the general welfare, and pending the completion of the investigations now being conducted to render the use of increasing quantities of water in the future unnecessary, I have the honour to apply for permission for The Sanitary District of Chicago to withdraw from lake Michigan through the Chicago river and Calumet river—not to exceed ten thousand cubic feet of water per second; such permission to be revocable at any time by The Secretary of War, and subject to such action as the Congress of the United States may see fit to take in the premises.

Respectfully submitted

George M. Wisner
Chief Engineer

Hon. Henry L. Stimson
Secretary of War
Washington, D.C.

APPENDIX D

[Permit of July 3, 1896]

4554.] IMPROVEMENT OF CHICAGO RIVER

July 3, 1896

SIR,—I have the honour to acknowledge the receipt of your letter of 16th ultimo, requesting permission to make certain changes in the capacity of the channel of the Chicago river for drainage purposes at points indicated on the map accompanying the application, and in reply beg to say that upon investigation it is found that the permission requested can be granted upon the following conditions:—

1. That while the general plan is approved, the Sanitary District of Chicago must furnish plans in triplicate on an enlarged scale showing each proposed new bridge, each by-pass, and each new dock or wharf proposed to be built, in order that the Secretary of War may act intelligently in each case.
2. That this authority shall not be interpreted as approval of the plans of the Sanitary District of Chicago to introduce a current into Chicago river. This latter proposition must hereafter be submitted for consideration.
3. That it will not cover obstructions to navigation by reason of this work while in progress or when completed.
4. That the United States shall not be put to expense by reason of this work.
5. That this authority will expire by limitation in two years from date unless extended.

Very respectfully

JOSEPH B. DOE
Acting Secretary of War

B. A. ECKHART, ESQ.
President the Sanitary District of Chicago
Rialto Building, Chicago, Ill.

[Permit of May 8, 1899]

Whereas, by section 10 of an Act of Congress, approved March 3, 1899, entitled 'An Act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbours, and for other purposes,' it is provided that it shall not be lawful to alter or modify the course, location, condition, or capacity of the channel of any navigable water of the United States unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same;

And whereas, the Sanitary District of Chicago, a municipal corporation organized under the laws of the State of Illinois, has constructed an artificial channel from Robey street, Chicago, to Lockport, and has heretofore been granted permission by the Secretary of War to make certain improvements in the Chicago river for the purpose of correcting and regulating the cross section of the river so as to secure a flowage capacity of 300,000 cubic feet per minute with a velocity of 1¼ miles an hour, it being intended to connect the said artificial channel with the West fork of the South branch of Chicago river at Robey street in the city of Chicago;

And whereas, the said Sanitary District of Chicago has now applied to the Secretary of War for permission to divert the waters of the said Chicago river and cause them to flow into the said artificial channel at Robey street, as aforesaid;

And whereas, the said Sanitary District of Chicago represents that such movable dams and sluice gates as are necessary to at all times secure absolute and complete control of the volume and velocity of flow through the Chicago river have been constructed.

Now, therefore, the Chief of Engineers having consented thereto, this is to certify that the Secretary of War hereby gives permission to the said Sanitary District of Chicago to open the channel constructed and cause the waters of Chicago river to flow into the same, subject to the following conditions:

1 That it be distinctly understood that it is the intention of the Secretary of War to submit the questions connected with the work of the Sanitary District of Chicago to Congress for consideration and final action, and that this permit shall be subject to such action as may be taken by Congress.

2. That if, at any time, it become apparent that the current created by such drainage works in the south and main branches of Chicago river be unreasonably obstructive to navigation or injurious to property, the Secretary of War reserves the right to close said discharge through said channel or to modify it to such extent as may be demanded by navigation and property interests along said Chicago river and its south branch.

3. That the Sanitary District of Chicago must assume all responsibility for damages to property and navigation interests by reason of the introduction of a current in Chicago river.

Witness my hand this 8th day of May, 1899.

[SEAL] R. A. ALGER

JOHN M. WILSON *Secretary of War*

Brigadier-General, Chief of Engineers, U.S. Army

[Permit of April 9, 1901]

Whereas, under date of May 8, 1899, the Secretary of War granted permission unto the Sanitary District of Chicago to open the artificial channel from Robey street, Chicago, to Lockport, and cause the waters of Chicago river to flow into the same, upon the following conditions, *inter alia.*

"2. That if, at any time it become apparent that the current created by such drainage works in the south and main branches of Chicago river be unreasonably obstructive to navigation or injurious to property, the Secretary of War reserves the right to close said discharge through said channel or to modify it to such extent as may be demanded by navigation and property interests along said Chicago river and its south branch;"

And whereas, it is alleged by various commercial and navigation interests that the present discharge from the river into the drainage canal sometimes exceeds 300,000 cubic feet per minute, causing a velocity of nearly 3 miles per hour, which greatly endangers navigation in the present condition of the river;

Now, therefore, this is to certify that the Secretary of War, upon the recommendation of the Chief of Engineers, hereby directs said Sanitary District to regulate the discharge from the river into the Drainage canal so that the maximum flow through the Chicago river and its South branch shall not exceed 200,000 cubic feet per minute.

Witness my hand this 9th day of April, 1901

[SEAL]

ELIHU ROOT
Secretary of War

[Permit of July 23, 1901]

THE SANITARY DISTRICT OF CHICAGO

SECURITY BUILDING
CHICAGO, July 15, 1901

SIR,—I have the honour to equest, on behalf of the Sanitary District of Chicago, that your order of April 9, 1901, restricting the flow of water through the Chicago river to 200,000 cubic feet of water per minute, may be so amended as to permit the controlling works at Lockport, the outlet of the main Drainage channel, to be so regulated as to permit at that point a flow of 300,000 cubic feet of water per minute between the hours of 4 p.m. and 12 o'clock midnight.

The board of trusteesof the Sanitary District have rigidly observed the restrictions of your order of April 9, 1901, but the result has been that the water in the main Drainage channel has become greatly polluted and very offensive both to sight and smell, and is working such hardship upon the valley communities as to evoke frequent protest from various cities and municipalities along the Desplaines and Illinois valleys.

By such a modification of your restricting order as is herein petitioned, it would be possible for the Sanitary District to secure much better drainage of the city of Chicago and the purification of the waters of the Chicago river without any hardship or inconvenience whatever to the interests of navigation, as the opening of the controlling works to a flow of 300,000 cubic feet of water per minute would produce no appreciable effect upon the current of the Chicago river until three hours thereafter and would not produce the full effect until about eight hours after the opening of the gates. Therefore, by again diminishing the flow at midnight to the requirements of your order, or to 200,000 cubic feet of water per minute, the normal condition in the Chicago river would be restored before 6 a.m. on the following day and thus no hardship or inconvenience occasioned to the navigation interests of the Chicago river.

I have the honour to be, very respectfully yours

Alex. J. Jones
President

To the Hon. Elihu Root
Secretary of War, Washington, D.C.

[Second indorsement]

Office, Chief of Engineers, U.S. Army
July 22, 1901

Respectfully returned to the Secretary of War.

By an instrument, dated April 9, 1901, the Secretary of War directed the Sanitary District of Chicago to regulate the discharge from the Chicago river into the Drainage canal so that the maximum flow through the Chicago river and its South branch shall not exceed 200,000 feet per minute.

The Sanitary District now asks that this order be so amended as to permit an increase of the flow into the canal to 300,000 cubic feet per minute between 4 p.m. and 12 midnight daily.

It is the opinion of Major Willard, expressed in the accompanying letter of the 16th instant, that the request should be granted subject to revocation by the Secretary of War in case the increase be found dangerous to navigation.

I concur in this opinion and recommend that the order of April 9, 1901, be modified accordingly.

G. L. Gillespie
Brigadier-General, Chief of Engineers, U.S. Army

[Third indorsement]

War Department
July 23, 1901

Approved as recommended by the Chief of Engineers

E. Root
Secretary of War

[Permit of December 5, 1901]

Whereas, under date of May 8, 1899, the Secretary of War granted permission unto the Sanitary District of Chicago to open the artificial channel from Robey street, Chicago, to Lockport, and cause the waters of Chicago river to flow into the same, upon the following condition, *inter alia:*

"2. That if at any time it becomes apparent that the current created by such drainage work in the south and main branches of Chicago river be unreasonably obstructive to navigation or injurious to property, the Secretary of War reserves the right to close said discharge through said channel or to modify it to such extent as may be demanded by navigation and property interests along said Chicago river and its south branch."

And, whereas, the Secretary of War subsequently directed said Sanitary District of Chicago to regulate the discharge of water into the Chicago Drainage canal so that the maximum flow through the Chicago river shall not exceed 200,000 cubic feet per minute from midnight to 4 p.m., nor 300,000 cubic feet per minute from 4 p.m. to midnight.

And, whereas, said Sanitary District of Chicago has applied to the Secretary of War for permission to increase the flow between midnight and 4 p.m. daily to 250,000 cubic feet per minute, and the Chief of Engineers has recommended that the increase applied for be granted, but that the rate of flow from 4 p.m. to midnight be reduced to 250,000 cubic feet per minute, so that the flow through the Chicago river shall not exceed 250,000 cubic feet per minute throughout the twenty-four hours of the day;

Now, therefore, this is to certify that, in accordance with the recommendation of the Chief of Engineers, the Secretary of War hereby gives unto said Sanitary District of Chicago permission to regulate said discharge so that the maximum flow through the Chicago river shall not exceed 250,000 cubic feet per minute throughout the twenty-four hours of the day, upon the following conditions:—

1. That this permission shall be in lieu of the present authorized rates of flow as stated above.
2. That the permission herein given shall be subject to such modification as in the opinion of the Secretary of War the public interests may from time to time require.
3. That said Sanitary District of Chicago shall be responsible for all damages inflicted upon navigation interests by reason of the increase in flow herein authorized.

Witness my hand this 5th day of December, 1901

Wm. Cary Sanger
Assistant Secretary of War

[Permit of January 17, 1903]

Whereas, under date of December 5, 1901, by an instrument supplementary to the original permission granted by the Secretary of War, May 8, 1899, to the Sanitary District of Chicago to open the artificial channel from Robey street, Chicago, to Lockport and cause the waters of Chicago river to flow into the same, the Secretary of War, pursuant to authority reserved in said permission of May 8, 1899, gave permission to the Sanitary District of Chicago to regulate said discharge so that the maximum flow through the Chicago river shall not exceed 250,000 cubic feet per minute throughout the twenty-four hours of the day, upon the following condition, *inter alia:*

"That the permission herein given shall be subject to such modification as in the opinion of the Secretary of War the public interests may from time to time require."

And, whereas, the said Sanitary District of Chicago has applied for permission to increase the flow through the Chicago river from 250,000 cubic feet per minute to 350,000 cubic feet per minute during the closed season of navigation, in order to carry off the accumulation of sewage deposit which line the shores along said city:

Now, therefore, this is to certify that, in accordance with the recommendation of the Chief of Engineers, the Secretary of War hereby gives unto said Sanitary District of Chicago permission to increase the flow through the Chicago river from 250,000 cubic feet per minute to 350,000 cubic feet per minute until the 31st day of March, 1903, after which date it shall be reduced to 250,000 cubic feet per minute, as now authorized, upon the following conditions:—

1. That the permission herein given shall be subject to such modifications as in the opinion of the Secretary of War the public interests may from time to time require.
2. That said Sanitary District of Chicago shall be responsible for all damages inflicted upon navigation interests by reason of the increase in flow herein authorized.

Witness my hand this 17th day of January, 1903

Wm. Cary Sanger
[seal] Assistant Secretary of War

[Permit of June 30, 1910]

For copy of the Permit of June 30, 1910, see Appendix K given below at page 261.

APPENDIX E

TREATY BETWEEN THE UNITED KINGDOM AND THE UNITED STATES OF AMERICA RELATING TO BOUNDARY WATERS AND QUESTIONS ARISING ALONG THE BOUNDARY BETWEEN CANADA AND THE UNITED STATES, SIGNED AT WASHINGTON, JANUARY 11, 1909

*Treaty relating to Boundary Waters and Questions arising along the Boundary between Canada and the United States, signed at Washington, January 11, 1909**

His Majesty the King of the United Kindgom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, and the United States of America, being equally desirous to prevent disputes regarding the use of boundary waters and to settle all questions which are now pending between the United States and the Dominion of Canada involving the rights obligations or interests of either in relation to the other or to the inhabitants of the other, along their common frontier, and to make provision for the adjustment and settlement of all such questions as may hereafter arise, have resolved to conclude a Treaty in furtherance of these ends, and for that purpose have appointed as their respective Plenipotentiaries:

His Britannic Majesty, the Right Honourable James Bryce, O. M., his Ambassador Extraordinary and Plenipotentiary at Washington; and

The President of the United States of America, Elihu Root, Secretary of State of the United States;

Who, after having communicated to one another their full powers, found in good and due form, have agreed upon the following Articles:

Preliminary Article

For the purposes of this Treaty boundary waters are defined as the waters from main shore to main shore of the lakes and rivers and connecting waterways, or the portions thereof, along which the international boundary between the United States and the Dominion of

---

*Ratification advised by the Senate	March 3 1909
Ratified by the President	April 1, 1910
Ratified by Great Britain	March 31, 1910
Ratifications exchanged at Washington	May 5, 1910
Proclaimed	May 13, 1910

Canada passes, including all bays, arms, and inlets thereof, but not including tributary waters which in their natural channels would flow into such lakes, rivers, and waterways, or waters flowing from such lakes, rivers, and waterways, or the waters of rivers flowing across the boundary.

Article 1

The High Contracting Parties agree that the navigation of all navigable boundary waters shall for ever continue free and open for the purposes of commerce to the inhabitants and to the ships, vessels, and boats of both countries equally, subject, however, to any laws and regulations of either country, within its own territory, not inconsistent with such privilege of free navigation, and applying equally and without discrimination to the inhabitants, ships, vessels, and boats of both countries.

It is further agreed that so long as this Treaty shall remain in force this same right of navigation shall extend to the waters of lake Michigan, and to all canals connecting boundary waters and now existing or which may hereafter be constructed on either side of the line. Either of the High Contracting Parties may adopt rules and regulations governing the use of such canals within its own territory, and may charge tolls for the use thereof; but all such rules and regulations and all tolls charged shall apply alike to the subjects or citizens of the High Contracting Parties and the ships, vessels, and boats of both of the High Contracting Parties, and they shall be placed on terms of equality in the use thereof.

Article 2

Each of the High Contracting Parties reserves to itself, or to the several State Governments on the one side and the Dominion or Provincial Governments on the other, as the case may be, subject to any Treaty provisions now existing with respect thereto, the exclusive jurisdiction and control over the use and diversion, whether temporary or permanent, of all waters on its own side of the line which in their natural channels would flow across the boundary or into boundary waters; but it is agreed that any interference with or diversion from their natural channel of such waters on either side of the boundary, resulting in any injury on the other side of the boundary, shall give rise to the same rights and entitle the injured parties to the same legal remedies as if such injury took place in the country where such diversion or interference occurs; but this provision shall not apply to cases already existing or to cases expressly covered by special agreement between the parties hereto.

It is understood, however, that neither of the High Contracting Parties intends by the foregoing provision to surrender any right which it may have to object to any interference with or diversions of waters on the other side of the boundary the effect of which would be productive of material injury to the navigation interests on its own side of the boundary.

Article 3

It is agreed that, in addition to the uses, obstructions, and diversions heretofore permitted or hereafter provided for by special agreement between the Parties hereto, no further or other uses or obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line, affecting the natural level or flow of boundary waters on the other side of the line, shall be made except by authority of the United States or the Dominion of Canada within their respective jurisdictions and with the approval, as hereinafter provided, of a Joint Commission, to be known as the International Joint Commission.

The foregoing provisions are not intended to limit or interfere with the existing rights of the Government of the United States on the one side and the Government of the Dominion of Canada on the other, to undertake and carry on governmental works in boundary waters for the deepening of channels, the construction of breakwaters, the improvement of harbours, and other governmental works for the benefit of commerce and navigation, provided that such works are wholly on its own side of the line and do not materially affect the level or flow of the boundary waters on the other, nor are such provisions intended to interfere with the ordinary use of such waters for domestic and sanitary purposes.

Article 4

The High Contracting Parties agree that, except in cases provided for by special agreement between them, they will not permit the construction or maintenance on their respective sides of the boundary of any remedial or protective works or any dams or other obstructions in waters flowing from boundary waters or in waters at a lower level than the boundary in rivers flowing across the boundary, the effect of which is to raise the natural level of waters on the other side of the boundary unless the construction or maintenance thereof is approved by the aforesaid International Joint Commission.

It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.

ARTICLE 5

The High Contracting Parties agree that it is expedient to limit the diversion of waters from the Niagara River so that the level of lake Erie and the flow of the stream shall not be appreciably affected. It is the desire of both Parties to accomplish this object with the least possible injury to investments which have already been made in the construction of power plants on the United States' side of the river under grants of authority from the State of New York, and on the Canadian side of the river under licenses authorized by the Dominion of Canada and the Province of Ontario.

So long as this Treaty shall remain in force, no diversion of the waters of the Niagara River above the Falls from the natural course and stream thereof shall be permitted except for the purpose and to the extent hereinafter provided.

The United States may authorize and permit the diversion within the State of New York of the waters of the said river above the Falls of Niagara, for power purposes, not exceeding in the aggregate a daily diversion at the rate of 20,000 cubic feet of water per second.

The United Kingdom, by the Dominion of Canada, or the Province of Ontario, may authorize and permit the diversion within the Province of Ontario of the waters of said river above the Falls of Niagara for power purposes, not exceeding in the aggregate a daily diversion at the rate of 36,000 cubic feet of water per second.

The prohibitions of this Article shall not apply to the diversion of water for sanitary or domestic purposes, or for the service of canals for the purposes of navigation.

ARTICLE 6

The High Contracting Parties agree that the St. Mary and Milk Rivers and their Tributaries (in the State of Montana and the Provinces of Alberta and Saskatchewan) are to be treated as one stream for the purposes of irrigation and power, and the waters thereof shall be apportioned equally between the two countries, but in making such equal apportionment more than half may be taken from one river and less than half from the other by either country so as to afford a more beneficial use to each. It is further agreed that in the division of such waters during the irrigation season, between the 1st of April and 31st of October, inclusive, annually, the United States is entitled to a prior appropriation of 500 cubic feet per second of the waters of the Milk River, or so much of such amount as constitutes three-fourths of its natural flow, and that Canada is entitled to a prior appropriation of 500 cubic feet per second of the flow of St. Mary River, or so much of such amount as constitutes three-fourths of its natural flow.

The channel of the Milk River may in Canada be used at the convenience of the United States for the conveyance, while passing through Canadian territory, of waters diverted from the St. Mary River. The provisions of Article 2 of this Treaty shall apply to any injury resulting to property in Canada from the conveyance of such waters through the Milk River.

The measurement and apportionment of the water to be used by each country shall from time to time be made jointly by the properly constituted reclamation officers of the United States and the properly constituted irrigation officers of His Majesty under the direction of the International Joint Commission.

Article 7

The High Contracting Parties agree to establish and maintain an International Joint Commission of the United States and Canada composed of six Commissioners, three on the part of the United States appointed by the President thereof, and three on the part of the United Kingdom appointed by His Majesty on the recommendation of the Governor in Council of the Dominion of Canada.

Article 8

This International Joint Commission shall have jurisdiction over and shall pass upon all cases involving the use or obstruction or diversion of the waters with respect to which under Articles 3 and 4 of this Treaty the approval of this Commission is required, and in passing upon such cases the Commission shall be governed by the following rules and principles which are adopted by the High Contracting Parties for this purpose:—

The High Contracting Parties shall have, each on its own side of the boundary, equal and similar rights in the use of the waters hereinbefore defined as boundary waters.

The following order of precedence shall be observed among the various uses enumerated hereinafter for these waters, and no use shall be permitted which tends materially to conflict with or restrain any other use which is given preference over it in this order of precedence—

1. Uses for domestic and sanitary purposes;
2. Uses for navigation, including the service of canals for the purposes of navigation;
3. Uses for power and for irrigation purposes.

The foregoing provisions shall not apply to or disturb any existing uses of boundary waters on either side of the boundary.

The requirement for an equal division may in the discretion of the Commission be suspended in cases of temporary diversions along boundary waters at points where such equal division can not be made advantageously on account of local conditions, and where such diversion does not diminish elsewhere the amount available for use on the other side.

The Commission in its discretion may make its approval in any case conditional upon the construction of remedial or protective works to compensate so far as possible for the particular use or diversion proposed, and in such cases may require that suitable and adequate provision, approved by the Commission, be made for the protection and indemnity against injury of any interests on either side of the boundary.

In cases involving the elevation of the natural level of waters on either side of the line as a result of the construction or maintenance on the other side of remedial or protective works or dams or other obstructions in boundary waters or in waters flowing therefrom or in waters below the boundary in rivers flowing across the boundary, the Commission shall require, as a condition of its approval thereof, that suitable and adequate provision, approved by it, be made for the protection and indemnity of all interests on the other side of the line which may be injured thereby.

The majority of the Commissioners shall have power to render a decision. In case the Commission is evenly divided upon any question or matter presented to it for decision, separate reports shall be made by the Commissioners on each side to their own Government. The High Contracting Parties shall thereupon endeavour to agree upon an adjustment of the question or matter of difference, and if an agreement is reached between them, it shall be reduced to writing in the form of a Protocol, and shall be communicated to the Commissioners, who shall take such further proceedings as may be necessary to carry out such agreement.

Article 9

The High Contracting Parties further agree that any other questions or matters of difference arising between them involving the rights, obligations, or interests of either in relation to the other or to the inhabitants of the other, along the common frontier between the United States and the Dominion of Canada, shall be referred from time to time to the International Joint Commission for examination and report, whenever either the Government of the United States or the Government of the Dominion of Canada shall request that such questions or matters of difference be so referred.

The International Joint Commission is authorized in each case so referred to examine into and report upon the facts and circumstances of the particular questions and matters referred, together with such conclusions and recommendatioms as may be appropriate, subject, however, to any restrictions or exceptions which may be imposed with respect thereto by the terms of the reference.

Such reports of the Commission shall not be regarded as decisions of the questions or matters so submitted either on the facts or the law, and shall in no way have the character of an arbitral award.

The Commission shall make a joint report to both Governments in all cases in which all or a majority of the Commissioners agree, and in case of disagreement the minority may make a joint report to both Governments, or separate reports to their respective Governments.

In case the Commission is evenly divided upon any question or matter referred to it for report, separate reports shall be made by the Commissioners on each side to their own Government.

Article 10

Any questions or matters of difference arising between the High Contracting Parties involving the rights, obligations, or interests of the United States or of the Dominion of Canada either in relation to each other or to their respective inhabitants, may be referred for decision to the International Joint Commission by the consent of the two Parties, it being understood that on the part of the United States any such action will be by and with the advice and consent of the Senate, and on the part of His Majesty's Government with the consent of the Governor-General in Council. In each case so referred, the said Commission is authorized to examine into and report upon the facts and circumstances of the particular questions and matters referred, together with such conclusions and recommendations as may be appropriate, subject, however, to any restrictions or exceptions which may be imposed with respect thereto by the terms of the reference.

A majority of the said Commissioner shall have power to render a decision or finding upon any of the questions or matters so referred.

If the said Commission is equally divided, or otherwise unable to render a decision or finding as to any questions or matters so referred, it shall be the duty of the Commissioners to make a joint report to both Governments, or separate reports to their respective Governments, showing the different conclusions arrived at with regard to the matters or questions so referred, which questions or matters shall thereupon be referred for decision by the High Contracting Parties to an Umpire chosen in accordance with the procedure prescribed in the fourth, fifth, and sixth paragraphs of article 45 of The Hague Convention for the pacific settlement of international disputes, dated October 18, 1907. Such Umpire shall have power to render a final decision with respect to those matters and questions so referred on which the Commission failed to agree.

ARTICLE 11

A duplicate original of all decisions rendered and joint reports made by the Commission shall be transmitted to and filed with the Secretary of State of the United States and the Governor-General of the Dominion of Canada, and to them shall be addressed all communications of the Commission.

ARTICLE 12

The International Joint Commission shall meet and organize at Washington promptly after the members thereof are appointed and when organized the Commission may fix such times and places for its meetings as may be necessary, subject at all times to special call or direction by the two Governments. Each Commissioner, upon the first joint meeting of the Commission after his appointment, shall, before proceeding with the work of the Commission, make and subscribe a solemn declaration in writing that he will faithfully and impartially perform the duties imposed upon him under this Treaty, and such declaration shall be entered on the records of the proceedings of the Commission.

The United States' and Canadian sections of the Commission may each appoint a Secretary, and these shall act as joint Secretaries of the Commission at its joint sessions, and the Commission may employ engineers and clerical assistants from time to time as it may deem advisable. The salaries and personal expenses of the Commission and of the Secretaries shall be paid by their respective Governments, and all reasonable and necessary joint expenses of the Commission, incurred by it, shall be paid in equal moieties by the High Contracting Parties.

The Commission shall have power to administer oaths to witnesses, and to take evidence on oath whenever deemed necessary in any proceeding, or inquiry, or matter within its jurisdiction under this Treaty, and all parties interested therein shall be given convenient opportunity to be heard, and the High Contracting Parties agree to adopt such legislation as may be appropriate and necessary to give the Commission the powers above mentioned on each side of the boundary, and to provide for the issue of subpoenas and for compelling the attendance of witnesses in proceedings before the Commission. The Commission may adopt such rules of procedure as shall be in accordance with justice and equity, and may make such examination in person and through agents or employés as may be deemed advisable.

ARTICLE 13

In all cases where special agreements between the High Contracting Parties hereto are referred to in the foregoing Articles, such agreements are understood and intended to include not only direct agreements between the High Contracting Parties, but also any mutual arrangement between the United States and the Dominion of Canada expressed by concurrent or reciprocal legislation on the part of Congress and the Parliament of the Dominion.

Article 14

The present Treaty shall be ratified by His Britannic Majesty and by the President of the United States of America, by and with the advice and consent of the Senate thereof. The ratifications shall be exchanged at Washington as soon as possible, and the Treaty shall take effect on the date of the exchange of its ratifications. It shall remain in force for five years, dating from the day of exchange of ratifications, and thereafter until terminated by twelve months' written notice given by either High Contracting Party to the other.

In faith whereof the respective Plenipotentiaries have signed this Treaty in duplicate and have hereunto affixed their seals.

Done at Washington, the 11th day of January, in the year of our Lord one thousand nine hundred and nine.

[L.S.] James Bryce
[L.S.] Elihu Root

The above Treaty was approved by the United States' Senate on the 3rd March, 1909, with the following Resolutions:—

Resolved,—That the Senate advise and consent to the ratification of the Treaty between the United States and Great Britain, providing for the settlement of international difference between the United States and Canada, signed on the 11th day of January, 1909.

Resolved further (*as a part of this ratification*),—That the United States approves this Treaty with the understanding that nothing in this Treaty shall be construed as affecting, or changing, any existing territorial, or riparian rights in the water, or rights of the owners of lands under water, on either side of the International Boundary at the rapids of the St. Mary's River at Sault Ste. Marie, in the use of the waters flowing over such lands, subject to the requirements of navigation in boundary waters and of navigation canals, and without prejudice to the existing right of the United States and Canada, each to use the waters of the St. Mary's River, within its own territory; and further, that nothing in this Treaty shall be construed to interfere with the drainage of wet, swamp, and overflowed lands into streams flowing into boundary waters, and that this interpretation will be mentioned in the ratification of this Treaty as conveying the true meaning of the Treaty, and will, in effect, form part of the Treaty.

PROTOCOL OF EXCHANGE

On proceeding to the exchange of the ratifications of the treaty signed at Washington on January 11, 1909, between Great Britain and the United States, relating to boundary waters and questions arising along the boundary between the United States and the Dominion of Canada, the undersigned plenipotentiaries, duly authorized thereto by their respective Governments, hereby declare that nothing in this treaty shall be construed as affecting, or changing, any existing territorial, or riparian rights in the water, or rights of the owners of lands under water, on either side of the international boundary at the rapids of the St. Mary's river at Sault Ste. Marie, in the use of the waters flowing over such lands, subject to the requirements of navigation in boundary waters and of navigation canals, and without prejudice to the existing right of the United States and Canada, each to use the waters of the St. Mary's river, within its own territory; and further, that nothing in this treaty shall be construed to interfere with the drainage of wet, swamp, and overflowed lands into streams flowing into boundary waters, and also that this declaration shall be deemed to have equal force and effect as the treaty itself and to form an integral part thereof.

The exchange of ratifications then took place in the usual form.

In witness whereof, they have signed the present Protocol of Exchange and have affixed their seals thereto.

Done at Washington this 5th day of May, one thousand nine hundred and ten.

James Bryce [seal]

Philander C. Knox [seal]

*The British ratification of this further Instrument was deposited with the United States Government July 23, 1910.

APPENDIX F

Laws of the Dominion of Canada

LEGISLATION ENACTED BY THE PARLIAMENT OF THE DOMINION OF CANADA FOR THE PURPOSE OF CARRYING INTO EFFECT THE PROVISIONS OF THE TREATY OF JANUARY 11, 1909, CREATING THE INTERNATIONAL JOINT COMMISSION

[1-2 George V]

CHAP. 28.—An Act Relating to the establishment and expenses of the International Joint Commission under the Waterway Treaty of January the eleventh, nineteen hundred and nine.

[Assented to 19th May, 1911]

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. The treaty relating to the boundary waters and to questions arising along the boundary between Canada and the United States made between His Majesty and the said United States, signed at Washington the eleventh day of January, one thousand nine hundred and nine, and the protocol of the fifth day of May, one thousand nine hundred and ten, in the schedule to this act, are hereby confirmed and sanctioned.

2. The laws of Canada and of the several Provinces thereof are hereby amended and altered so as to permit, authorize, and sanction the performance of the obligations undertaken by His Majesty in and under the said Treaty; and so as to sanction, confer, and impose the various rights, duties and disabilities intended by the said treaty to be conferred or imposed or to exist within Canada.

3. Any interference with or diversion from their natural channel of any waters in Canada, which in their natural channels would flow across the boundary between Canada and the United States or into boundary waters (as defined in the said treaty) resulting in any injury on the United States side of the boundary, shall give the same rights and entitle the injured parties to the same legal remedies as if such injury took place in that part of Canada where such diversion or interference occurs; but this section shall not apply to cases existing

on the eleventh day of January, one thousand nine hundred and nine, or to cases expressly covered by special agreement between His Majesty and the Government of the United States.

4. The Exchequer Court of Canada shall have jurisdiction at the suit of any injured party or person claiming under this act in all cases in which it is sought to enforce or determine as against any person any right or obligation arising or claimed under or by virtue of this act.

5. The International Joint Commission, when appointed and constituted pursuant to the said treaty shall have power, when holding joint sessions in Canada, to take evidence on oath and to compel the attendance of witnesses by application to a judge of a superior court of the Province within which such session is held, and such judge is hereby authorized and directed to make all orders and issue all processes necessary and appropriate to that end.

6. The Governor in Council may appropriate annually, out of the consolidated revenue fund, a sum not exceeding seventy-five thousand dollars toward the payment of the salaries of the commissioners to be appointed by His Majesty on the recommendation of the Governor in Council, as well as the salaries of the secretary and other officers and employees, and also all other expenses which may be incurred by such commissioners, with the approval of the Minister of Public Works together with one-half share of all reasonable and necessary joint expenses of the said commission incurred by it and, under the terms of the said treaty, required to be paid in equal moieties by the high contracting parties.

7. Each of the said commissioners who is appointed by His Majesty shall receive as compensation for his services an amount to be fixed by the Governor in Council, but not in any case to exceed the sum of seventy-five hundred dollars per annum. The secretary appointed by the Canadian section of the commission under the provisions of the said treaty shall receive as compensation for his services a sum not exceeding three thousand dollars per annum.

2. In addition to the said compensation the commissioners and secretary shall receive their actual travelling and other expenses necessarily incurred in connection with and in the course of the discharge of their official duties.

3. The commissioners may from time to time employ, subject to the approval of the Minister of Public Works, such clerical and other assistance as is deemed advisable; their compensation and expenses to be fixed at such amounts as may be determined by the Commissioners and approved by the Minister of Public Works, and the commissioners are further authorized to expend an amount to be fixed by the Minister of Public Works, not in excess of three thousand dollars per annum, for office accommodation, equipment, and supplies.

APPENDIX G

Laws of the United States

LEGISLATION ENACTED BY THE CONGRESS OF THE UNITED STATES FOR THE PURPOSE OF CARRYING INTO EFFECT THE PROVISIONS OF THE TREATY OF JANUARY 11, 1909, CREATING THE INTERNATIONAL JOINT COMMISSION

[Sundry civil appropriation act, June 25, 1910]

(Public—No. 266)

For the purpose of paying salaries and expenses and the one-half share of all reasonable and necessary joint expenses of the commission incurred under the terms of the treaty between the United States and Great Britain concerning boundary waters between the United States and Canada, signed January eleventh, nineteen hundred and nine, seventy-five thousand dollars, or so much thereof as may be necessary, to be expended under the direction of the Secretary of State.

[Deficiency appropriation act, March 4, 1911]

(Public—No. 480)

Of the appropriation of seventy-five thousand dollars carried in the sundry civil appropriation act for the fiscal year ending June thirtieth, nineteen hundred and eleven, concerning the boundary waters between the United States and Canada, five thousand dollars may be used for the rent of buildings in the District of Columbia from the date of the approval of said sundry civil act.

[Sundry civil appropriation act, March 4, 1911]

(Public—No. 525)

For salaries and expenses, including salaries of commissioners and salaries of clerks appointed by the commissioners on the part of the United States with the approval solely of the Secretary of State, including rental and furnishing, after the passage of this act, of offices at Washington, District of Columbia, and necessary travelling expenses, and for the one-half of all reasonable and necessary joint expenses of the International Joint Commission incurred under the terms of the treaty between the United States and Great Britain concerning the use of boundary waters between the United States and Canada, and other purposes, signed January 11th, nineteen hundred and nine, seventy-five thousand dollars, together with the balance unexpended July first, nineteen hundred and eleven, of the appropriation made for said joint commission for the fiscal year nineteen hundred and eleven: *Provided*, That the salaries of the members of said commission on the part of the United States shall be fixed by the President, and the amount appropriated for the payment of salaries and other expenses hereunder shall be disbursed under the direction of the Secretary of State; that said commission or any member thereof shall have power to administer oaths and to take evidence on oath whenever deemed necessary in any proceeding or inquiry or matter within its jurisdiction under said treaty, and said commission shall be authorized to compel the attendance of witnesses in any proceedings before it, or the production of books and papers when necessary by application to the Circuit Court of the United States for the circuit within which such session is held, which court is hereby empowered and directed to make all orders and issue all processes necessary and appropriate for that purpose.

APPENDIX H

Statement as to the Effect on Lake Erie Commerce of a Permanent Lowering of one inch in the Water Surface of Lake Erie

To accompany the hearing of Brigadier General William H. Bixby, Chief of Engineers, upon the Diversion of Water from the Niagara river for power purposes, before the Committee on Foreign Affairs, House of Representatives.

In view of the general interest in the very important question of the water levels of the Great Lakes, referred to incidentally at the public hearings relative to the Niagara Falls diversion, it is deemed pertinent to invite attention of the Committee to the statement of Brigadier General William L. Marshall, Chief of Engineers, in transmitting to the Secretary of War, Major Keller's report of November 30, 1908. (Page 8, Senate Document 105, 62nd Congress, first session), to the following effect:

"As each inch of draft for the modern lake freighter is the equivalent of from eighty to one hundred tons of profitable cargo, the aggregate loss per season for the entire fleet using lake Erie ports as terminals becomes a very large amount."

Major Keller in his report (Page 15, Senate Document 105, 62nd Congress, first session) said:

"The earning capacity of each freighter will be reduced to the extent of $75 to $100 per trip. During an average season the loss for each vessel would total $2,500 to $3,000."

The total commerce using lake Erie ports may be stated as approximately sixty-three million tons per annum of which from thirty million to forty million tons is now carried in vessels of ten thousand tons burden or over, which may be affected in any lowering of the water surface. Based upon the above figures and assuming that cargo is available in quantity to permit the loading of each vessel, on each trip, to the maximum draft permitted by the controlling depths of lake Erie ports, the total potential loss to lake Erie commerce due to a permanent lowering of one inch in the water surface may be taken at from $250,000 to $350,000 per annum; and this potential figure will increase with the anticipated natural increase in the number and size of the larger vessels, and in the total commerce of the lake. When the time comes that a matter of inches becomes a question of immediate importance to lake Erie commerce, any lowering of that lake due to the Niagara diversions (which affect only lake

Erie and Upper Niagara river) can be readily controlled by proper regulation works in Niagara river*; although such slight effect and ready control will not be true of the Chicago diversion which is several times greater in amount, and must affect all four lower lakes and the St. Lawrence river, to a serious extent, unless controlled at several places by regulation works of great final cost in time and money.

(Extract, Report of Hearings before the Committee on Foreign Affairs, House of Representatives on Preservation of Niagara Falls).

---

*See *supra*, pp. 7-8.

APPENDIX I

WAR DEPARTMENT, OFFICE OF THE CHIEF OF ENGINEERS

WASHINGTON, February 28, 1912

MEMORANDUM FOR THE SECRETARY OF WAR

(As to the Sanitary District diversion of water from lake Michigan, through the Chicago river, Sanitary District Canal, Illinois river to the Mississippi valley.)

There are several special features of this Chicago Sanitary District diversion and Illinois river power and waterway proposition which need special explanation to any one studying the proposition.

For purposes of *navigation* alone by canal and canalized river from lake Michigan to the Mississippi river, on the Illinois river and its headwaters and connecting canals and to keep the locks and pools full, a diversion from lake Michigan of less than 1,000 second-feet of water will easily supply any reasonable demands and is all that will be actually necessary; and any greater diversion is a greater injury than benefit to navigation. The works of the Sanitary District of Chicago originally constructed mainly for purposes of *sanitation*, were designed to allow the diversion of 10,000 second-feet, which they now request, and they are now found to be large enough for a total diversion of 14,000 second-feet, the additional 4,000 second-feet having been requested by them and refused by the War Department a few years ago (injunction suit still in progress), the extra water to be taken from Lake Michigan through the Calumet river and a connecting canal following the Sag route. The amounts requested, while perhaps needed at the present time, will not be necessary later, after the full installation of the more modern improved methods of treating sewage. The War Department, while awaiting the definite action of Congress, has so far permitted the diversion of 4,167 second-feet. The Sanitary District by its own recent statements, is understood to be using about 7,000 second feet. While it appears to have been assumed at times that the Sanitary District will be finally allowed by the United States to divert 10,000 second-feet so long as actually necessary for sanitary purposes, the diversion of the waters of the Great Lakes from their natural outlet so far as desired merely for aid for power development is of doubtful legality by reason of the terms of the recent treaty between the United States and Great Britain, which appears to require the approval of such a diversion by the International Joint Commission created pursuant to said treaty. The treaty enables riparian owners of Canada, as well as of the United States, who consider themselves injured by such diversion, to bring suit in United States courts to protect their interests. The treaty also, although recognizing as proper the use of water necesssary for sanitary purposes, provides for action, if necessary, by the Commission after request from the United States Congress, or the Canadian Parliament, and no other organization has power of final decision. It is the opinion of the Engineer, Lakes-to-the-Gulf Waterway Board (January 23, 1911), that, in view of the rights and interests of navigation, only such water should be diverted from lake Michigan as is indispensable for sanitation, and then only with a provision for construction and maintenance of proper compensating works in the outlets of the lakes to prevent a lowering of their levels; and that although water thus diverted may be used incidentally for power purposes, great care must be exercised by the War Department, when waiving the objections of navigation to the diversion of water for sanitary purposes, to not extend such waiver beyond the amount actually necessary for sanitation alone.

Diversion of water from lake Michigan and the St. Lawrence basin into the Illinois river and the Mississippi river and the Mississippi river basin is seriously objectionable from many standpoints, and should be permitted under the recent treaty with Canada only to such extent as is *necessary for sanitation of the City of Chicago.* The objections to such diversion of water are briefly as follows:

(a) The *levels* of Lakes Michigan, Huron, and Erie, for the last twenty years, and at the present moment, are lower than their average of the last fifty years; and their levels are now again *falling. Every foot of draft* in the harbours of these lakes and in the connecting rivers—St. Marys, St. Clair, and Detroit—is *exceedingly valuable to navigation*; and every cubic foot per second of water flow taken out of lake Michigan in excess of its natural outflow through lake Huron and the St. Clair river is a permanent loss to the waterflow of the St. Lawrence basin, and tends to injure navigation over the entire waterway from lake Michigan to the Gulf of St. Lawrence. While compensating works at the outlets of lake Huron, lake St. Clair, lake Erie, and lake Ontario may be possible to an extent sufficient to maintain the existing and past levels of these lakes they will be very expensive and can not in any case prevent loss to the St. Lawrence basin, of any water diverted into the Mississippi basin; and any loss of water by such diversion will make necessary further expensive contraction works or dams or dredging in St. Clair, Detroit, and St. Lawrence rivers, in order to maintain channel depths. Moreover, the same loss of water will permanently injure and diminish the water-power development capacity of the Niagara and St. Lawrence rivers.

(b) Moreover, *the dumpage of sewage into rivers* while heretofore allowable, is becoming more *objectionable* every year and is being prevented more and more every year by enactments of State legislatures throughout the country. Chicago, with reference to the Illinois river, is in much the same situation as Worcester, Mass., with reference to the Blackstone river. In days long past the sewage of Worcester flowed into the Blackstone and was carried down through the States of Massachusetts and Rhode Island into Narragansett bay. The danger and damage to the people and industries of the Blackstone river led to enactments of laws by the Massachusetts Legislature forbidding further sewage contamination of any of the State rivers, thus forcing the inland cities of Massachusetts to the disposal of sewage by modern improved methods based upon mechanical and chemical treatment. As Chicago and the cities along the Illinois river increase in population, it is to be expected that the results of the sewage contamination of the river, and the legislative action of Massachusetts will be practically duplicated in Illinois where the remedy will be possible at a lower cost per head of population; after which the diversion of large quantities of lake Michigan water into Illinois river, being then no longer necessary for the sanitation of Chicago, and neither now nor then for navigation* between lake Michigan and the Mississippi river, and being already of detriment and serious danger to the important interests of navigation of the Great Lakes system, will no longer have any reason for continuance except for local benefit inside the State of Illinois.

(c) Looked at from the point of view of *conservation of water power*, every cubic foot of water diverted from lake Michigan into the Illinois river is an economic loss to the United States as a whole, as well as to Canada, because the local conditions as regard river slope and fall are such that this water, if sent through the Niagara and St. Lawrence rivers to the Atlantic, can develop twice as much power in the State of New York and, at the same time, twice as much power in the Dominion of Canada as it can develop in Illinois if sent through the Illinois and Mississippi rivers to the Gulf of Mexico.

From the above it is evident that *it is of the greatest importance* to the United States that the diversion of water from lake Michigan into the Illinois river should be limited to merely such amount as is actually indispensable to sanitation; and that the United States should reserve to itself the right to redetermine such amount every few years as local conditions change.

W. H. Bixby
Chief of Engineers, U.S. Army

---

*Even on the supposition that the waterway from lake Michigan to the Mississippi river should at some future time provide for the passage of boats of over 20 feet draft or any other greatest draft useful in the Great Lakes, *such a navigation can be maintained with a diversion of lake Michigan water less than one-fifth of that at present in progress and less* than one-fourteenth of that desired at present by the State authorities.

APPENDIX J

Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Report by a Special Board of Engineers upon a Waterway from Lockport, Ill., by way of the DesPlaines and Illinois Rivers, to the mouth of said Illinois River, and Certain Related Subjects

War Department
Washington, February 9, 1911

Sir: I have the honour to transmit herewith a letter from the Chief of Engineers, U.S. Army, of this date, together with copy of report made by a special Board of Engineers appointed in pursuance of the river and harbour act approved June 25, 1910, to consider and report upon a waterway from Lockport, Ill., by way of the DesPlaines and Illinois rivers, to the mouth of the Illinois river, and certain related subjects.

Very respectfully,

J. M. Dickinson
Secretary of War

The Speaker of the House of Representatives

War Department
Office of the Chief of Engineers
Washington, February 9, 1911

Sir: I have the honour to submit herewith, for transmission to Congress, report dated January 23, 1911, made by the special Board of Engineers appointed in pursuance of the river and harbour act approved June 25, 1910, to consider and report upon a waterway from Lockport, Ill., by way of the DesPlaines and Illinois rivers to the mouth of Illinois river, and certain related subjects.

This report has been referred to the Board of Engineers for Rivers and Harbours for review, as required by law, and in its report this Board concurs in general with the special Board in its conclusions concerning the waterway from Lockport to the mouth of the Illinois river. The only essential difference between the views of the two boards is upon the extent of co-operation by the United States in the construction of the portion of the waterway between Lockport and

Utica. In the opinion of the Board of Engineers for Rivers and Harbours no expenditures for construction should be made by the United States on this section of the waterway. In the opinion of the special Board the $20,000,000 authorized to be appropriated by the State should be sufficient to entirely complete this section of the waterway, including the locks and bridges over the waterway; but, if through unforseen contingency these funds prove insufficient, the United States would be warranted in assisting the State by contributing such part of the cost as might be eventually found necessary to complete construction of suitable locks in the dams below Lockport and of bridges over this section of waterway.

As to minor differences or suggestions of the Board of Engineers for Rivers and Harbours, the following remarks are submitted: It was anticipated by the special Board that report on the improvement of the Mississippi river by dams at or near Jefferson Barracks and Commerce would be submitted before the next session of Congress and before the State of Illinois could take the action toward the construction of the waterway between Lockport and Utica, which is considered necessary to warrant the United States in adopting any project for the section of the Mississippi river in question. The recommendations of the special Board as to the diversion of water from lake Michigan are that said diversion be restricted to the minimum required for purposes of sanitation; but should the diversion eventually authorized by Congress exceed that contemplated by the Board a change in the method of improvement of the Illinois river as indicated by the Board of Engineers for Rivers and Harbours may then be desirable. If the United States authorizes the Sanitary District of Chicago to divert water from lake Michigan for purposes of sanitation, and also conveys to the State any equities in may possess in the rights of way or other properties of the Illinois and Michigan Canal upon completion of the proposed waterway as recommended by the special Board, it is believed that such action would relinquish to local agencies any rights the Government may have in the water power to be developed between Lockport and Utica. It was anticipated by the special Board that no action would be taken by Congress for the adoption of any definite project until the State of Illinois was in the position to guarantee the expenditure of $20,000,000 on the section of the waterway between Lockport and Utica, and that any such legislation by Congress would be made to harmonize with any policy that it might adopt with reference to the diversion of water from lake Michigan under the recent treaty with Great Britain.

By the terms of the river and harbour act approved June 25, 1910, I am member and president of the special Board, and I concur in its report.

It is believed that the $1,000,000 already appropriated by the United States should be expended in improving the Illinois river below Utica to the depth recommended by the Board; that this work should not be undertaken until an equal or greater depth above Utica is assured by the plans and operations of the State of Illinois.

Very respectfully

W. H. BIXBY
Chief of Engineers, U.S. Army

The SECRETARY OF WAR

REPORT BY A SPECIAL BOARD OF ENGINEERS ON WATERWAY FROM LOCKPORT, ILLINOIS, TO MOUTH OF ILLINOIS RIVER

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ENGINEER
Washington, January 23, 1911

SIR: The Board of Engineers appointed by the Secretary of War September 8, 1910, in Special Orders, No. 43, Office of the Chief of Engineers, for the consideration of a waterway from Lockport, Ill., by way of the DesPlaines and Illinois rivers to the mouth of said Illinois river, has the honour to submit the following report, supplemental to its preliminary report of November 1, 1910:

FEASIBILITY OF THE WATERWAY

In the numerous surveys, under instructions from Congress, for a waterway from the Great Lakes to the Mississippi river, the line from Bridgeport, on the South Branch of the Chicago river, to Lockport, on the DesPlaines, thence along the DesPlaines river to the Illinois, and along the Illinois to its mouth, has uniformly been considered the most feasible. In all projects a canal has been proposed from Bridgeport to Lockport, and the river bed utilized below La Salle. In the earlier ones, a canal between Lockport and La Salle was advocated, but since the Chicago Drainage Canal has been excavated through the Chicago divide and now insures an adequate supply of water for the channel, the canalization of the DesPlaines and Illinois Rivers, with short canals around rapids, has been generally recommended. In the valley of the DesPlaines and upper Illinois, rivers the rock is sufficiently near the surface to provide excellent foundations; the lower Illinois has an exceptionally gentle slope, averaging about 0·13 foot per mile, so that any reasonable depth can be obtained by dredging, and the present diversion from Lake Michigan through the Chicago Drainage Canal is more than sufficient for the channel. It is therefore the opinion of the Board that the waterway from Lockport to the mouth of the Illinois river is feasible.

THE MOST ADVISABLE DEPTH AND DIMENSIONS FOR THE WATERWAY

Waterways from the Great Lakes to the Mississippi river have been proposed varying in depth from 4½ to 24 feet. In determining the most advisable depth of the waterway it is necessary to consider the probable commerce, its character, its origin, its destination, and the dimensions of the vessels in which it can be most economically transported. Experience has shown that as a general rule coarse and bulky articles seek water transportation, while the finer manufactured products are shipped by rail. Of the 62,363,218 tons transported through the St. Marys Falls Canals in 1910, about 97 per cent consisted of iron ore, coal, grain, and lumber. Crude manufactured products, such as pig iron, ingots, and steel rails, are also naturally shipped by water, and in thickly settled communities like New York there is a large water commerce in building materials, such as brick, stone, lime, cement, sand, and gravel.

The Illinois river flows through one of the richest farming regions of the United States. There are along its banks large mineral deposits, especially coal, building stone, and the ingredients for making cement, so that the valley itself is capable of producing a large amount of the commodities which seek water transportation. The natural markets for this section are now Chicago and St. Louis, and were both New Orleans and the Northwest connected with the Illinois river by suitable transportation they might become additional markets. The Board on a survey of the Mississippi river, whose report is published as House Document No. 50, Sixty-first Congress, first session, made a careful investigation of the probable commerce of the section of this water route from St. Louis, Mo., to its mouth, which is already of width and depth sufficient for its present commerce, and concluded that neither the natural and industrial resources nor the density of population along the Mississippi river were sufficient to create a large water-borne commerce, and that only from its tributaries could be expected a commerce sufficient to justify a large expenditure for greater dimensions. The Ohio river and its tributaries penetrate the iron and coal fields of the Appalachan system, and have on their banks large manufacturing centers at Pittsburg, Wheeling, Cincinnati, Louisville, Nashville, Chattanooga, and elsewhere. The upper Mississippi affords a line of water transportation for the grain, iron ore, and lumber of the Northwest, the Missouri reaches the grain fields of the West, and the White, Arkansas, and Red Rivers afford an outlet for southern products. In addition it is the expectation of many of the advocates of a waterway from Chicago to the Gulf that much of the commerce of the Great Lakes can be diverted thereto, although it now generally moves in an east and west direction. Finally, there is the commerce of the Gulf, expected to largely increase with the completion of the Panama Canal, some of which it is claimed would be carried to Chicago were an adequate waterway provided. There are, therefore, four sources of possible commerce for the proposed waterway: First, its immediate banks; second, the tributary rivers; third, the Great Lakes; and fourth, the Gulf of Mexico.

The types of vessels which can most economically handle such commerce differ radically. A vessel navigating the ocean has to combat violent storms and severe wave action, and requires such relations between length, width, and depth as to secure good lines, great stiffness of hull, and maximum stability. For ocean service the experience of the past 50 years has evolved an economic freight steamer with a draft between 20 and 30 feet, though at a few of the principal ports vessels drawing from 30 to 40 feet are being introduced.

On the Great Lakes, since storm waves are not as large as on the ocean, and harbours of refuge are more frequent, less structural strength is necessary in vessels, and for the same draft the displacement may be much greater than on the ocean. Experience on the Great Lakes has evolved an economic bulk cargo steamer with a length of 550 to 600 feet, which, when loaded to an ultimate draught of 21 to 24 feet, carries a cargo of 10,000 to 15,000 tons. The package freighter employed on the Lakes by the various railway corporations is of somewhat smaller dimensions and has a draught of 18 to 19 feet. These two types of vessels now carry the bulk of the iron ore, coal, grain, and merchandise of the Great Lakes and the cost of transportation has been reduced at least half in the past 20 years.

On rivers, vessels are not exposed to wave action, and their structural strength and draft for the same displacement can therefore further be diminished. The early river packet was a frail stern or side wheel steamer having a draft of 3 to 10 feet, but as a freight carrier it has now been generally displaced by barges, which experience has demonstrated to be more economical. These barges have a draft not exceeding 8½ feet and a capacity up to 3,000 tons. They are assembled in tows and handled by a powerful towboat, in which the same economies in steam consumption are obtained as in the modern lake or ocean steamship.

The experience of foreign nations in river navigation is similiar to that of the United States, as is illustrated by the enormous traffic of the River Rhine which, according to the "Statistik des Deutschen Reichs, Band 226," amounted in 1908 to about 54,000,000 tons between Strasburg and the Dutch frontier. The low-water depth of the channel upon which this large volume of freight was carried, as described in the prelimimary report of the United States National Waterways Commission, 1910, was only 9·8 feet for 110 miles from the Dutch frontier up to Cologne, thence 8·2 feet for 82 miles to St. Goar, thence 6·6 feet for 79 miles to Mannheim, and thence 4 feet for 84 miles to Strassburg. About 30 per cent of the traffic of 1908 used the river above Cologne where the available depths vary, as above stated, from 4 feet in the section immediately below Strasburg, to a maximum of 8·2 feet in the section immediately above Cologne. Bulky commodities are transported in fleets of barges towed by special steamers designed for the purpose. The United States Consul General at Berlin reported to the Department of State under date of August 18, 1909, that the capacity of the largest Rhine barges is over 2,600 tons, with a length of 3,36·6 feet, a beam of 39·6 feet, and a maximum draft of 9·4 feet; that the largest Rhine towboat has a length of 249·3 feet, a breadth of 29·5 feet, and that the most powerful have from 1,300 to 1,450 horsepower. Under date of March 7, 1910, he reported that the Rhine boats on an average are 237 feet long and 30·6 feet beam, with carrying capacity of from 480 to 1,000 tons on draughts of 4 to 7½ feet. Package freight is carried in separate steamers, and he stated that the capacity of the largest Rhine freight steamer is 975 tons, with a draught of 7·9 feet, a length of 278·9 feet, and a breadth of 29·5 feet. According to a report made by Maj. F. A. Mahan, Corps of Engineers, retired, in 1903 the total number of sailing vessels and towed barges on the Rhine was then 8,379, and the total number of towboats was 745, while of other steamers of all classes there were but 378, including 156 package freight steamers. According to information furnished by the American consul general at Frankfort in 1908 the Rhine fleet consisted of 1,318 steam vessels with indicated horsepower of 295,849 and 9,759 barges with a carrying capacity of 3,960,378 tons, or 11,077 vessels in all. These figures plainly show the predominating character of towboat navigation. No other river of Europe carries a commerce comparable with that of the Rhine, and it is clear that for the proposed waterway a channel equal to that now found on the Rhine will be adequate for an immense traffic.

From the preceding it follows that if the waterway is to be used by vessels capable of navigating the ocean and the Great Lakes, it should be given a depth sufficient for the economic carriers above described, and this, in the opinion of the Board, should be not less than 24 feet; but if it is to be constructed for vessels adapted to river traffic, economic navigation does not require its depth to exceed 9 feet. The depth of 14 feet so strenuously insisted upon by certain advocates of the waterway, is greater than necessary for river navigation, and entirely insufficient for either lake or ocean vessels. The only canals of 14 feet depth of which the board has knowledge are the Canadian canals along the St. Lawrence river and the Welland Canal connecting lakes Erie and Ontario, which were constructed in the infancy of lake navigation. Little use is now made of them for transportation to and from Chicago. This depth has not been adopted by any other nation, nor retained by Canada in recent projects.

A 24-foot waterway from Chicago to the Gulf has never been considered by Congress, but its cost would be enormous, and even if constructed, it would never be used commercially by the vessels for which designed. Barge navigation on rivers has been developed to such efficiency that it is estimated in House Document No. 492, Sixtieth Congress, first session, that coal can be shipped from Pittsburg to New Orleans in a 9-foot channel for 0.376 mills per ton-nile, which is a low rate even for lake and ocean vessels of 21-foot draft. Both lake and ocean vessels are designed for use in waters of great depth and unlimited width which they navigate with unrestricted speed and comparative safety, but on rivers, canals, or other contracted waters, they must materially reduce their speed and sometimes require assistance by tugs. In the report of the committee on the canals of New York State, 1899, it is shown that the first cost of lake vessels is so great, and their rate of speed on canals so slow, that interest charges alone will prevent them from competing with barge navigation. Moreover, on the Mississippi river, with its swift current, crooked channels, and other difficulties of navigation, insurance charges would place them at a further disadvantage as compared with the ordinary river craft. Ocean, lake, and river boats have been specially designed for the work they have to perform, and when diverted therefrom, lose in economy. Should a lake vessel drawing 14 feet attempt to engage in commerce between Duluth and Liverpool via the Mississippi river, it would be in competition with the modern lake freighter from Duluth to Chicago, the modern barge and towboat from Chicago to New Orleans, and the modern ocean freighter from New Orleans to Liverpool, each specially adapted to its portion of the route and able to carry freight for less than one-half the rate the vessel of 14 feet draft would be forced to charge.

Considered as a business investment, a waterway of even moderate depth from Chicago to the Gulf is still more or less experimental. There is already maintained under existing projects a channel of 9 feet depth from New Orleans to Cairo, and of 8 feet from Cairo to St. Louis, and of at least 4½ feet from St. Louis to Chicago via the

Illinois and Michigan Canal. With the exception of coal from the Ohio river, the existing commerce on any portion of this route is small. To justify even existing expenditures, commerce must be developed in the tributaries, and until it is created a further enlargement of the main stream will not be warranted. A uniform depth in the Mississippi and its leading tributaries will be far more beneficial to the navigation interests of the United States than a main channel of great depth with shallow feeders. As a channel of 8 feet depth is now maintained from Cairo to St. Louis, and can be extended from St. Louis to Utica at relatively small cost, business caution dictates that a waterway of this depth be obtained and tested before entering upon enormously expensive projects of questionable utility.

Should commerce respond to these comparatively moderate expenditures and utilize the Waterway provided, and should an increasing traffic demonstrate the necessity for additional depth, then a channel of 9 feet depth can be constructed from Cairo to Utica. This can be obtained at a small additional cost and will correspond to the depth provided by the existing projects for improving the Ohio and lower Mississippi rivers. For the locks and other new constructions between Utica and Lockport the extra foot of depth should be obtained at the outset, since its cost will be comparatively small. When a 9-foot waterway has been provided between Chicago, St. Louis, New Orleans, and the cities in the Ohio Valley, should navigation keep pace with the improvement and still greater depths appear economically desirable, they may be created without sacrificing the work now recommended by the Board. In such case, the original locks will still be valuable to provide for the smaller craft which will continue to navigate the minor tributaries as well as the main stream.

The course thus outlined corresponds to that which the Government has so successfully pursued with the large commerce on the Great Lakes, where it has deepened and enlarged channels as navigation has required. Harbours of 23 feet depth and the new 24½-foot lock at the St. Marys Falls Canal are now logical, but to have constructed them when the navigation of the lakes was confined to vessels drawing but 12 feet would not have been a judicious expenditure of public funds. The old Weitzel Lock is still profitably utilized for the passage of light-draft boats, and thus relieves the new deeper locks, which are frequently taxed to their full capacity.

The board considers a bottom width of 160 feet in canal and 200 feet in the open river above the mouth of the Illinois sufficient for a channel of 8 or 9 feet available depth. For safety and ease of navigation the channel should be excavated to 11 feet in rock cuts and canals, and the locks should be given 11 feet depth, 80 feet width, and 600 feet useful length. With these lock dimensions three barges, carrying about 9,000 tons of freight, may be locked through with their tow boat. A waterway of these dimensions would have a capacity exceeding 100,000,000 tons per annum, and would accommodate barge tows carrying about nine times the ordinary train load of this vicinity. In addition, the vessels using it would be capable of navigating the Ohio and lower Mississippi rivers. Such a waterway will not require a diversion of more than 1,000 second-feet from Lake Michigan, and this amount would not injuriously lower lake levels nor cause excessive flooding of lands in the Illinois Valley.

Cooperation with the State of Illinois

On December 8, 1910, the Hon. Charles S. Deneen, governor of Illinois, accompanied by Mr. Isham Randolph, chairman, and Mr. Robert I. Randolph, secretary, of the Internal Improvement Commission of Illinois, appeared before the Board and made an explanation of the policy and plans of the State in connection with the development of the proposed waterway. In anticipation of the hearing, Mr. Isham Randolph, designated by the governor as the authorized agency of the state of Illinois, filed with the Board a letter and plans embodying the State's proposals. A copy of the letter accompanies this report, marked "Appendix A."

Briefly, the project presented by the State of Illinois contemplates the development of water power at 4 sites between Lockport and Utica, and the improvement of navigation by the construction of 5 large locks, 80 by 900 feet in horizontal dimensions, with 24 feet depth on their miter sills. The uppermost lock of the series will be at Lockport connecting with Lake Michigan, and the lowest will be at Utica, connecting with the already improved portion of the Illinois river. The locks between Lockport and Utica are to be connected by channels 300 feet wide, 24 feet deep as far as Lock No. 2 at Brandon Bridge below Joliet, and thence to Utica of not less than 9 feet immediate, and not less than 14 feet later, depth, and a bottom width of not less than 200 feet. These channels are to be in the river bed, except at the mouth of the Des Plaines river and at Marseilles, where short sections of the canal are proposed. This project is practically the same as that printed in the 1909 report of the Internal Improvement Commission of Illinois, and the estimate of cost is $19,957,517. It differs from any heretofore submitted to Congress in that it proposes the utilization for power purposes of the water which may flow through the Chicago Drainage Canal and contemplates an ultimate channel depth of 24 feet for navigation purposes, though the estimates provide for 24 feet only to Brandon Bridge and for 14 feet below.

The Board of Engineers whose report on a survey for a navigable Waterway 14 feet deep from Lockport to the mouth of the Illinois river is published in House Document No. 263, Fifty-ninth Congress, first session, estimates the cost of the same portion of the route at $15,647,902, but its plan contemplates 2 canals about 3 miles long at Joliet and Marseilles, and 5 movable dams and 9 locks. The locks are to be 600 by 80 feet, with 14 feet on the sills, and existing conditions are to be changed as little as practicable, thus avoiding damages to riparian owners whether for power rights or for overflow.

A careful examination has been made of the detailed estimates presented by the State of Illinois. So far as concerns the engineering features alone, such an excavation, construction of dams, locks, power plants, &c., the estimated cost is reasonable. The State's estimate, however, includes nothing for flowage damages nor for the purchase of water-power rights and franchises, and should the outcome of judicial proceedings now pending cause these damages and rights to assume great value, the State's estimate would then be insufficient.

For purposes of navigation a diversion from Lake Michigan of less than 1,000 second-feet of water is all that will be necessary. For purposes of sanitation the works of the Sanitary District of Chicago were designed to allow the diversion of 10,000 second-feet, and now contemplate a total of 14,000 second-feet, the additional 4,000 second-feet to be obtained by the diversion of water through the Calumet river and a connecting canal following the Sag route. The War Department, while awating the definite action of Congress. has so far permitted the diversion of 4,167 second-feet and the Sanitary District is understood to be using about 7,000 second-feet. As the water which is at present being diverted from the lake appears to have already seriously affected the navigation of its harbors and connecting waterways, prompt congressional action is recommended to limit the diversion.

While it appears to have been assumed that the Sanitary District may be allowed to divert 10,000 second-feet so long as actually necessary for sanitary purposes, the diversion of the waters of the Great Lakes from their natural outlet for power development alone is inadmissible, under the recent treaty between the United States and Great Britain. The future diversion of water from Lake Michigan for any purpose is fraught with difficulties. Not only has Canada an interest in the maintenance of lake levels which the United States must recognize, but every foot of water flowing through the Chicago Drainage Canal lessens the flow at Niagara Falls and at the power sites along the St. Lawrence river, where, due to the fall available, the same amount of water will create about four times the power that can be generated from it on the Des Plaines and Illinois rivers.

The treaty enables riparian owners of Canada, as well as the United States, who consider themselves injured by such diversion, to bring suit in United States courts to protect their interests. The claim that more than 1,000 cubic feet per second is required for purposes of navigation can not be maintained. The treaty, however, recognizes as proper the use of water for sanitary purposes, and it is the opinion of the Board that only such water should be diverted from Lake Michigan as is indispensable for sanitation, and then only with a provision for proper compensation works in the outlets of the lakes to prevent a lowering of their levels. Water thus diverted may be used incidentally for power purposes, but care must be exercised in authorizing the diversion of water for sanitary purposes, to restrict it to the amount necessary for those purposes alone.

By virtue of the act of Congress of March 30, 1822, dedicating to the State of Illinois the land necessary for a canal connecting the Illinois river with Lake Michigan, and the act of March 2, 1827, granting to the State certain public lands for the purpose of aiding in its construction, and the acceptance by the State of the conditions imposed therein, the State of Illinois obligated itself to construct a suitable waterway from Lake Michigan to the navigable waters of the Illinois river. In accordance with this agreement the State constructed the Illinois and Michigan Canal, from Bridgeport to La Salle, and improved the upper portion of the Illinois river by the construction of locks and dams at Henry and Copperas Creek.

For many years this waterway was a valuable transportation route, but in recent years the Statt has neglected it and failed to maintain it abreast of the needs of commerce. The work now proposed by the State in connection with the canal of the Chicago Sanitary District contemplates a waterway from Lake Michigan to Utica, which, although departing from the line of the old canal, substitutes a waterway more than sufficient for any probable navigation. This will in effect fulfill the original agreement between the State and General Government for this section and incidentally develop a water-power which the State considers a profitable business investment. State or local agencies are better adapted than the General Government for conserving water-power for their citizens.

The Board believes that the State is more generous in its provisions for navigation than necessity requires, that the locks it proposes are larger than will be utilized, and that its original agreement would be amply fulfilled if it constructed locks 600 by 80 by 11 feet, and reserved at each lock ground sufficient for an additional lock should it ever be required, but it is also of the opinion that the State should be permitted to expend its own funds in such manner as it deems proper. With locks of the dimensions suggested by the Board the $20,000,000 authorized to be appropriated by the State should complete this part of the waterway; and unless large expenditures are required for power rights, even the larger locks could be constructed for that amount.

The General Government will then fully cooperate with the State in a waterway from Lockport to the mouth of the Illinois river if it assumes charge of the State structures at Henry and Copperas Creek, and enlarges the existing channel in the Illinois river below Utica to suitable dimensions. The Mississippi river from the mouth of the Illinois to St. Louis should also be suitably deepened.

* * * * * * * * *

Until it obtains further data the Board defers its report upon the measures required to properly preserve the levels of the Great Lakes and to compensate so far as practicable for the diminished level in such lakes by reason of any diversion of water from Lake Michigan; upon the influence on volume and height of waters in the Missippissi river below Cairo; upon the effect upon the climate of the Lake States by a change in the natural currents of Lake Michigan; upon the improvement of the Mississippi between the mouth of the Illinois river and the mouth of the Ohio river by the construction of a dam at or near Jefferson Barracks, and a dam at or near Commerce, and the developement of water power incidentally created by such dams.

Respectfully submitted

W. H. Bixby
Brig. Gen., Chief of Engineers, United States Army

C. McD. Townsend
Colonel, Corps of Engineers

C. Keller
Major, Corps of Engineers

J. B. Cavanaugh
Major, Corps of Engineers

John Bogart
Civil Engineer

The Chief of Engineers, U.S. Army

20711 W.D.

APPENDIX K

War Department
Washington, June 30, 1910

Sir:—Referring to your application of 27th instant on behalf of the Board of Trustees of the Sanitary District of Chicago to open a channel from the Calumet river to its existing main channel so as to substitute two routes instead of one between lake Michigan and its canal, I have the honor to advise you to the following effect:

It appears from the records of the Department that by an instrument executed May 8, 1899, the Sanitary District of Chicago was given permission to connect its drainage canal with the south branch of the Chicago river at Robey street, in the city of Chicago, and to divert the waters of lake Michigan through the Chicago river into said canal subject to certain specified conditions designed to limit the amount of such diversion and in other ways to protect the public interest. The permission so granted was subsequently modified at various times, and by an instrument executed December 5, 1901, the amount of flow was fixed at not exceeding 250,000 cubic feet per minute, equivalent to 4,167 cubic feet per second, which is the present rate allowed. At the time the original permit was given a connection with the Calumet river was not mentioned, but if it had been it is probable that a connection with that river as well as with the Chicago river would have been allowed.

So long as the water-flow remains unchanged there seems to be no special objection to its extension to both rivers instead of confining it to a single one, especially since if the new (Calumet) route be developed later to a navigable state the double route will be advantageous to navigation interests. Accordingly, in view of the favorable recommendation of the Chief of Engineers and of the consent thereto by the Attorney General, under the conditions hereinafter prescribed, the Department hereby modifies the existing permission so as to allow the division of the already permitted water-flow in such a manner as to reach the Sanitary District Canal by way of the Calumet river and a conecting channel, as well as by way of its present route through the Chicago river, subject to all pertinent conditions of the existing permissions and to other express conditions, as follows:

(*a*) That it be distinctly understood that it is the intention of the Secretary of War to submit the questions connected with the work of the Sanitary District of Chicago to Congress for consideration and final action, and that this permit shall be subject to such action as may be taken by Congress.

(*b*) That if at any time it become apparent that the current created by such drainage work in the Calumet, as well as Chicago, rivers be unreasonably obstructive to navigation, or injurious to property, the Secretary of War reserves the right to close the discharge through said channels or rivers, or to modify it to such an extent as may be demanded by navigation and property interests along said rivers.

(*c*) That the Sanitary District of Chicago must assume all responsibility for damages to property and navigation interests by reason of the introduction of a current in the Calumet as well as Chicago rivers.

(*d*) That the amount of water withdrawn from lake Michigan, through the Chicago and Calumet rivers together, shall not exceed the amount of 250,000 cubic feet per minute (4,167 cubic feet per second) already authorized to be withdrawn through the Chicago river alone.

(*e*) That the permission herein given shall be subject to such modification as in the opinion of the Secretary of War the public interests may from time to time require.

(*f*) That this permission shall in no wise affect or in any manner be used in the friendly suit now pending in the Circuit Court of the United States for the Northern District of Illinois, brought by the United States of America against the Sanitary District of Chicago, to determine the right of the said Sanitary District to divert from lake Michigan for sanitary purposes an amount of water in excess of that now being diverted without having first obtained a permit from the Secretary of War.

(*g*) That the War Department shall have free access at all times to the water-flow records of the Sanitary District of Chicago, and free access also to the regulating works and all other parts of its canals for the purpose of checking records or making water-flow measurements.

(*h*) That the plans for the proposed work shall be submitted to and approved by the Chief of Engineers and the Secretary of War.

(*i*) That the work shall be subject to the supervision and approval of the Engineer Officer of the United States Army in charge of the locality.

Very respectfully

ROBERT SHAW OLIVER
Acting Secretary of War

MR. GEORGE M. WISNER
Chief Engineer
Sanitary District of Chicago
Washington, D.C.

APPENDIX L

REPORT ON THE EFFECT OF THE CHICAGO DRAINAGE CANAL DIVERSION ON THE WATER LEVELS OF MONTREAL HARBOUR: PREPARED ON THE INSTRUCTIONS OF THE SHIPPING FEDERATION OF CANADA BY EDWARD BATH, F.I.A.C.E. AND ARTHUR SURVEYER, A. MEM. CAN. SOC. C.E.

MONTREAL, March 25th, 1912

To the Shipping Federation of Canada
Montreal

GENTLEMEN:—We beg to report as instructed by Mr. F. E. Meredith, K.C. on the effects of the proposed diversion by the Chicago Drainage canal on the water level in Montreal harbour.

Our report is based on the data given in the published Government reports and other official authorities quoted.

Particulars of the Chicago Drainage Canal

The Chicago Drainage canal was opened in 1900; in 1903 the United States War Department granted power to take from lake Michigan a volume of water of 4,167 cubic feet per second. It is generally admitted that the Canal has for some years been diverting over 7,000 cubic feet per second. The Board of Trustees of the Sanitary District of Chicago have applied to the Secretary of War for permission to divert 10,000 cubic feet per second.

In a pamphlet entitled "The Sanitary District of Chicago and the Chicago Drainage Canal," by Mr. Isham Randolph, M. Am. Soc. C.E. and chief engineer of the Canal, he gives the following information concerning the section in rock. The bottom width is 160′.0, width at water level is 162′.0, depth of water is 22′.0 and on bottom longitudinal slope 1 in 20,000.

This canal can pass from 15,000 to 19,000 cubic feet per second according to the roughness or smoothness of the sides. If the Sanitary District of Chicago is granted permission to take 10,000 cubic feet per second it will be impossible (under existlng control) to ascertain that they comply with the authorization or exceed their rights in the future as they have in the past.

Effects of the Proposed Diversion on Lake Levels

The majority of experts acknowledge that such a diversion would certainly lower the levels of the Great Lakes and of the St. Lawrence river. We give below a summary of the effect of the proposed diversions on lake Michigan and lake Huron as calculated by three American engineers, Mr. L. C. Sabin, M. Am. Soc. C.E., General Superintendent of the Sault Ste Marie canal, Mr. E. S. Wheeler, M. Am. Soc. C.E., U.S. Assistant Engineer, and Gen. O.H. Ernst, U.S.A.M., Am. Soc. C.E., Chairman, American Section of the International Waterways Commission.

Diversion from lake, in cubic feet per sec.	CHANGE IN LEVEL OF LAKE HURON		
	Mr. Sabin	Mr. Wheeler	Gen. Ernst
10,000	5 to 7½ ins.	4.76 ins.	6¼ ins.
4,000	2 to 3 ins.	1.90 ins.	

In the International Waterways Commission's report dated January 4th, 1907, the amounts by which the mean level would be lowered by a diversion at Chicago of 10,000 or 14,000 feet per second respectively are given as follows:—

Location	WATER LEVELS LOWERED BY DIVERSION OF	
	10,000 c.f.s.	14,000 c.f.s.
Lake Huron and Michigan	0.52 feet	0.70 feet
Lake St. Clair	0.45 "	0.64 "
Lake Erie	0.45 "	0.64 "
Lake Ontario	0.35 "	0.49 "
St. Lawrence river at Rapide Plat	0.40 "	0.56 "

In 1910 Mr. Arthur Surveyer, hydraulic engineer, Montreal, using the discharge measurements made by the U.S. Army Engineers at Three Point Section calculated that lake St. Francis would be lowered 0.40 feet by the diversion of 10,000 cubic feet per second, and 0.60 feet by a diversion of 14,000 cubic feet per second.

In the 1911 report of the Lake Carriers' Association the following statement made by General W. H. Bixby, Chief Engineer, U.S. Army, is quoted, "during the past four years lake Superior has dropped about

0.80 feet thereby losing in storage capacity more than four months, "total discharge; lakes Michigan, Huron and Erie in the past two "years have each dropped about 0.80 feet, and Lake Ontario in the "past two years has dropped about 1.50 feet. On all the Lakes the "present water surface is at least 0.50 feet below the average in the "past 51 years. The Lake Survey records for 1911 indicate that all "the lakes are continuing their rapid drop in level."

"Under the above circumstances further diversion from lake "Michigan by the Chicago Drainage District becomes more serious "and its effects much more to be feared than heretofore. Lake Superior can no longer be looked to by the Sanitary District as a source "of storage, as it will be at least two years before it can be brought "back to its level of 1905; and any holding back of water of lake "Superior to restore its level by artificial means must necessarily mean "a more rapid drop in the levels of lakes Michigan, Huron, Erie, "and Ontario. The end of 1912 will probably see the level of these "four lakes lower than in 1895-1896 (the lowest yet known since "1860) and more than 1.50 feet lower than their averages for the "past 51 years."

The gauge readings at the foot of lake St. Francis show that the mean level for the last five years has (during the navigation season) been 0.44 feet lower than the average mean level for the last fifty years.

The Chicago Drainage canal was opened in 1900, but it was agreed that it would take five years before the effect would be apparent; since its opening the Chicago Drainage canal has diverted from lake Michigan an average of, say 5,000 cubic feet per second; this quantity should have lowered lake Huron only 0.26 feet, and lake St. Francis 0.20 feet. It is safe, therefore, to conclude (even allowing for a change in the precipitation), that the probable effects of the Chicago Drainage canal were not overstated by the authorities quoted above.

Effects of Contributary River Ottawa at Montreal

In arriving at our conclusions concerning the effect of the diversion of 10,000 c.f.s. at Montreal harbour, it is necessary to take into account the contributary volume of the Ottawa river to the St. Lawrence above Montreal harbour.

There are four outlets of the Ottawa river from lake of Two Mountains; viz., the Vaudreuil and the Ste. Anne branches, which flow into the St. Lawrence River *above* Montreal: the riviere des Mille Isles and the riviere des Prairies, which become confluent to the St. Lawrence about 16 miles *below* Montreal harbour.

The flow of the St. Lawrence river at the outlet of lake St. Francis varies from 360,000 to 180,000 cubic feet per second; the discharge of the Ottawa river at the outlets of lake of Two Mountains fluctuates between 310,000 to 21,600 cubic feet per second.

The Georgian Bay ship canal report published in 1909 gives the following data concerning the high and low water flow of the Ottawa River into the St. Lawrence river above, and below, Montreal.

——	High Water 1876 cubic feet per second	Low water 1906 cubic feet per second
Vaudreuil Branch, Ottawa river	60,400	2,940
Ste. Anne Branch, Ottawa river	86,550	5,820
Total flowing into Montreal Harbour	146,950	8,760
Rivieres de Mille Isles, Ottawa river	35,520	520
Riviere des Prairies, Ottawa river	127,530	12,320
Total flowing into St. Lawrence below Montreal	163,050	12,840

At high water therefore the discharge of the Ottawa river into the St. Lawrence river is somewhere between 40 and 50% of the flow of the St. Lawrence at the mouth of lake St. Francis, but at low water the volume of the Ottawa River passing Montreal harbour is only about 5% of the St. Lawrence discharge.

If the Vaudreuil and the Ste. Anne branches were dammed, and the total discharge of the Ottawa river diverted into the Mille Iles and Prairies rivers, the level of Montreal harbour would certainly be materially affected; this diversion would at low water amount to 8,760 cubic feet per second, or 1,240 cubic feet per second less than the proposed Chicago Drainage canal diversion.

Effects of Diversion on Montreal Harbour

In order to determine the effects on Montreal harbour of the diversion of 10,000 cubic feet per second, we have used the data collected by the hydraulic branch of the Public Works Department, Canada. The Ottawa river has been gauged very frequently and at all stages, so that it is possible now with the data at hand to calculate the discharge of the river for any given date. The U. S. Army Engineers have made numerous gaugings at the Three Point Section and referred them to the lower Cornwall canal gauge on lake St. Francis, but in the vicinity of Montreal the Department of Public Works, Canada, only began, in 1910, to take discharge measurements. We have to base our calculations on a few observations, taken in 1910 and 1911, which gives sufficient data to draw a fairly good curve of the low water discharge.

Taking the low water in Montreal harbour as elevation 18.0 above sea level, the effects of a 10,000 cubic feet per second diversion at different stages of the river would be as follows:

Elevations on Lachine gauge	Lowering in tenths of a foot	Lowering in inches
18.0 feet	1.00 feet	12 inches.
19.0 "	0.92 "	11 "
20.0 "	0.85 "	10¼ "
21.0 "	0.68 "	8¼ "
22.0 "	0.30 "	3½ "
22.5	0.08 "	1 "
23.0 "	not noticeable	not noticeable

For demonstration purposes we have applied the above deductions to the Montreal harbour covering a period from 1903 to 1911: the results are shown in the accompanying table.

We have also included a diagram* which shows the relative variation of the water levels of lake Ontario, lake St. Francis, and the river St. Lawrence at Montreal harbour, and illustrates the lowering of the water levels at each respective place during recent years, and especially the effect at Montreal harbour.

Effects on the St. Lawrence below Montreal Harbour

The discharge curve of the St. Lawrence river below Bout de l'Ile referred to the Sorel Gauge shows that a diversion of 10,000 cubic feet per second would lower the river by about 7 inches at low water, and that no effect would be apparent at high water.

We have only referred generally to the effect at Sorel, but consider that the levels will be materially lowered further down the river to tidal waters and probably below.

Summary and General Conclusion

Summarizing our report we have to state that in our opinion the water levels in Montreal harbour by the diversion of 10,000 c.f.s. will be affected throughout the whole navigation season, from May to November, on an average of 5 inches lower, and during the low water months by an average of 10 inches, with the possibility of a drop to 12 or 13 inches in exceptional low water seasons.

In conclusion we have to point out that during the period from 1903 to 1911, 63 months of total navigation, the water levels of Montreal harbour would (if this diversion had been operative) have been affected for 48 months. Applying this to shipping interests, the effect would be very serious, as the draught of all vessels trading to Montreal is calculated for freight purposes on the minimum depth of water.

---

*Diagram not reproduced.

In presenting the foregoing report we have to state that in consequence of the limitation of time it has been impossible to deal with all the aspects and effects of the proposed diversion to the shipping interests of the Port of Montreal, but the foregoing deals with the main issues of our instructions.

We respectfully submit this report

EDW. BATH
ARTHUR SURVEYOR

TABLE showing what would have been the effect of diversion of 10,000 cubic feet per second on the water levels in Montreal harbour.

MONTH	—	1903			1904		
		Lachine gauge	Fall, in inches	Lowered to	Lachine gauge	Fall, in inches	Lowered to
		Ft. In.	In.	Ft. In.	Ft. In.	In.	Ft. In.
May	Highest	23 5	0	23 5	27 5	0	27 5
	Lowest	21 11	4	21 7	25 8	0	25 8
June	Highest	22 6	1	22 5	27 7	0	27 7
	Lowest	21 2	7	20 7	23 5	0	23 5
July	Highest	22 9	0	22 9	23 4	0	23 4
	Lowest	20 11	8	20 3	21 4	7	20 9
August	Highest	21 5	6	20 11	21 5	6	20 11
	Lowest	19 9	10	18 11	20 7	9	19 10
September	Highest	20 0	10	19 2	23 1	0	23 1
	Lowest	19 4	11	18 5	20 9	9	20 0
October	Highest	20 10	8	20 2	24 30	0	24 3
	Lowest	19 4	11	18 5	22 10	0	22 10
November	Highest	19 5	11	18 6	23 3	0	23 3
	Lowest	17 9	12	16 9	21 3	7	20 8
		1905			1906		
May	Highest	23 5	0	23 5	23 6	0	23 6
	Lowest	20 1	10	19 3	21 11	4	21 7
June	Highest	21 11	4	21 7	23 9	0	23 9
	Lowest	20 11	8	20 3	21 11	4	21 7
July	Highest	21 3	7	20 8	21 8	5	21 3
	Lowest	20 2	10	19 4	19 2	11	18 3
August	Highest	20 7	9	19 10	19 4	11	18 5
	Lowest	19 5	11	18 6	18 2	12	17 2
September	Highest	20 0	10	19 2	18 5	12	17 5
	Lowest	19 3	11	18 4	17 8	12	16 8
October	Highest	19 6	10	18 8	18 4	12	17 4
	Lowest	18 10	11	17 11	17 1	13	16 0
November	Highest	19 6	10	18 8	18 9	11	17 10
	Lowest.	18 8	11	17 9	17 8	12	16 8

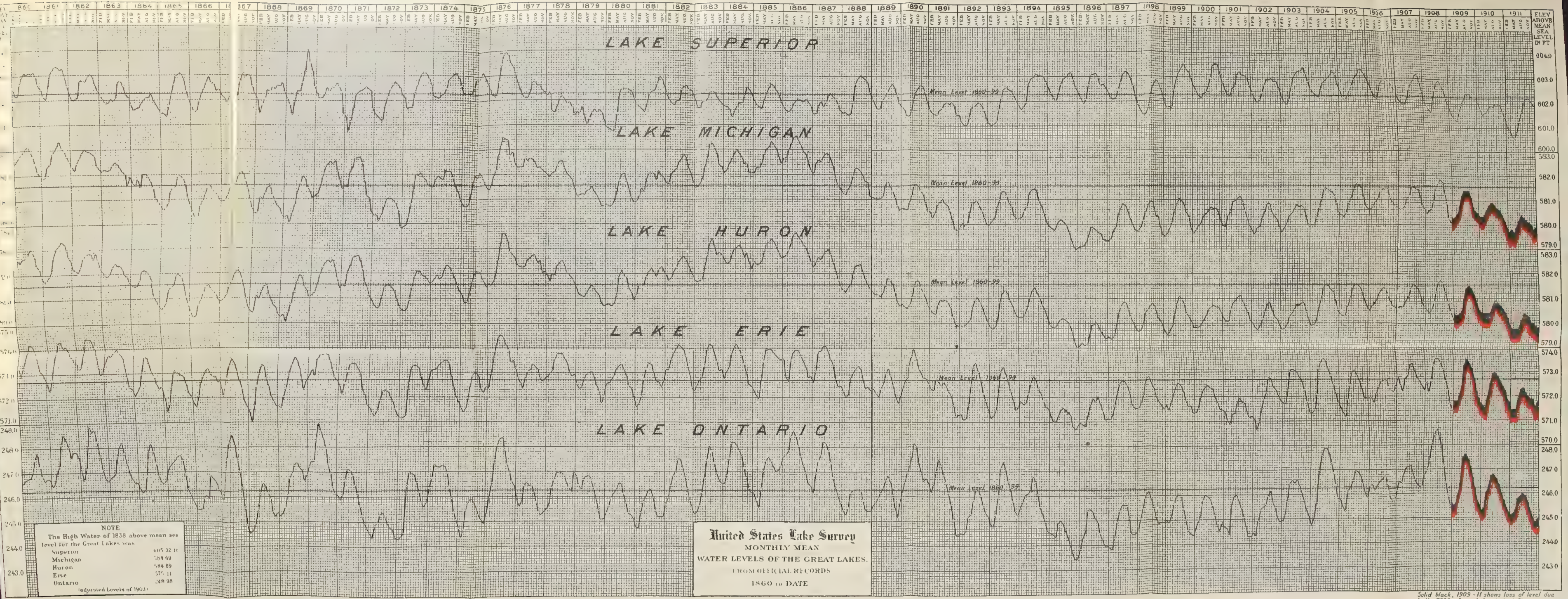
NOTE.—All elevations given in feet above mean sea level.

TABLE showing what would have been the effect of diversion of 10,000 cubic feet per second on the water levels in Montreal harbour—*Continued.*

MONTH	—	1907			1908		
		Lachine gauge.	Fall, in inches.	Lowered to.	Lachine gauge.	Fall, in inches.	Lowered to.
May..........	Highest	24 8	0	24 8	29 4	0	29 4
	Lowest	22 10	0	22 10	26 2	0	26 2
June..........	Highest	23 11	0	23 11	28 1	0	28 1
	Lowest	22 1	3	21 10	23 2	0	23 2
July...........	Highest	22 7	1	22 6	23 1	0	23 1
	Lowest	20 10	8	20 2	21 1	8	20 5
August........	Highest	20 11	8	20 3	21 7	6	21 1
	Lowest	19 1	11	18 2	19 8	10	18 10
September....	Highest	19 7	10	18 9	20 7	9	19 10
	Lowest	18 10	11	17 11	18 8	11	17 9
October.......	Highest	20 4	9	19 7	18 11	11	18 0
	Lowest	19 4	11	18 5	17 8	12	16 8
November....	Highest	22 1	3	21 10	18 7	11	17 8
	Lowest	19 1	11	18 2	17 7	12	16 7
		1909			1910		
May..........	Highest	28 9	0	28 9	25 8	0	25 8
	Lowest	24 2	0	24 2	23 2	0	23 2
June..........	Highest	28 0	0	28 0	24 6	0	24 6
	Lowest.	22 2	3	21 11	22 0	4	21 8
July...........	Highest	22 0	4	21 8	22 0	4	21 8
	Lowest	20 8	9	19 11	20 8	9	19 11
August........	Highest	21 6	6	21 0	20 11	8	20 3
	Lowest	19 9	10	18 11	20 3	10	19 5
September....	Highest	19 10	10	19 0	20 10	8	20 2
	Lowest	19 2	11	18 3	19 8	10	18 10
October.......	Highest	20 1	10	19 3	20 8	9	19 11
	Lowest	18 6	11	17 7	19 6	10	18 8
November...	Highest	19 9	10	18 11	20 8	9	19 11
	Lowest	17 11	12	16 11	19 9	10	18 11

TABLE showing what would have been the effect of diversion of 10,000 cubic feet per second on the water levels in Montreal harbour—*Concluded.*

MONTH	—	1911				
		Lachine gauge		Fall, in inches	Lowered to	
		Ft.	In.	In.	Ft.	In.
May.—	Highest	25	11	*0*	*25*	*11*
	Lowest	23	3	*0*	*23*	*3*
June	Highest	24	4	*0*	*24*	*4*
	Lowest	22	2	*3*	*21*	*11*
July	Highest	22	0	*4*	*21*	*8*
	Lowest	20	0	*10*	*19*	*2*
August	Highest	20	1	*10*	*19*	*3*
	Lowest	19	5	*11*	*18*	*6*
September	Highest	20	0	*10*	*19*	*2*
	Lowest.	18	8	*11*	*17*	*9*
October	Highest	18	8	*11*	*17*	*9*
	Lowest	17	10	*12*	*16*	*10*
November	Highest	19	1	*11*	*18*	*2*
	Lowest	17	8	*12*	*16*	*8*



NOTE

The High Water of 1838 above mean sea level for the Great Lakes was

Superior	605.32 ft
Michigan	584.69
Huron	584.69
Erie	575.11
Ontario	248.98

(adjusted Levels of 1903)

United States Lake Survey
MONTHLY MEAN
WATER LEVELS OF THE GREAT LAKES.
FROM OFFICIAL RECORDS
1860 to DATE

Solid black, 1909-11 shows loss of level due to the 7000 c.f.s. abstracted at Chicago

Note:
The Sanitary District is now abstracting 7,000 c.f.s though only 4,167 c.f.s. has been authorized.

Red shows effect of abstraction of the 3,000 c.f.s. additional diversion if the Sanitary District were allowed to increase to 10,000 c.f.s., the amount now being taken

Canada. Marine and Fisheries, Dept. of

RE PAPERS RELATING TO THE DIVERSION OF WATER FROM LAKE MICHIGAN BY THE SANITARY DISTRICT OF CHICAGO

[illegible] [illegible]
[illegible] Papers

LIBRARY
MAY 13 1912
UNIVERSITY OF TORONTO

In accordance with the instruction of Hon. J. D. Hazen, Minister of Marine and Fisheries, a copy of the publication intituled "Papers Relating to the Diversion of Waters from Lake Michigan, by the Sanitary District of Chicago," has been sent you under separate cover.

The Canadian Government has published a large edition of these Statements and is making a liberal distribution throughout the Dominion and the cities bordering on the Great lakes. It is believed that, in this way, public opinion will be fully informed respecting the dangers that threaten the navigation and allied interests of the Great lakes and the St. Lawrence and will be aroused to the necessity of preventing the city of Chicago taking action that injuriously affects the waterline on four thousand miles of shore; that injuriously affects a multitude of interests in two nations and that injuriously affects the riparian rights in a vast territory.

RE PAPERS RELATING TO THE DIVERSION OF WATER FROM LAKE MICHIGAN BY THE SANITARY DISTRICT OF CHICAGO

The Reply of the Canadian Government to the statement filed by the Sanitary District of Chicago was presented to Hon. Mr. Stimson, United States Secretary of War, Washington, on April 16th last.

On February 5, 1912, the Sanitary District applied to the United States Secretary of War for permission to increase the amount of water diverted from lake Michigan, to dilute Chicago's sewage, from the amount allowed, viz., 4,167 cubic feet per second to 10,000 cubic feet per second. At the first hearing in Washington on February 29th, after the applicants had preferred their arguments in favor of the granting of the application, the navigation and other interests in the United States opposing the application were heard.

At the request of Ambassador Bryce, the Canadian Government and Canadian navigation interests were allowed four weeks in which to prepare memorials of protest against the application. At this hearing, on March 27th last, the case for the Canadian Government was argued by Daniel Mullin, K.C., of St. John, N.B. Protests were also filed by the Commission of Conservation, Dominion Marine Association, Shipping Federation, Montreal and Toronto Harbour Commissioners and Montreal, Toronto and Kingston Boards of Trade.

These were the first comprehensive presentations of the case that had been made and counsel for Chicago acknowledged that it was a very strong indictment. In the Reply, filed by the Chicago Sanitary District with the Secretary of War, seven days later, they attempted, but without success, to meet the arguments that had been preferred by the Canadians. The second statement of the Canadian Government traverses the various points raised in the Reply of Counsel for Chicago and is a sweeping arraignment of that city for its endeavor to abstract from the basin of the St. Lawrence an enormous volume of water, ostensibly to purify its sewage, but really to generate enormously valuable water-powers in the Desplaines river.

The "Conclusions" as set forth in the Second Statement on behalf of the Canadian Government are as follows:

1. That there is no imperative necessity for such a large diversion of water from lake Michigan for sanitary purposes, as is requested in the application.

2. That the historical facts presented in this brief show conclusively that the Sanitary canal cannot be considered as the outgrowth and development of a scheme which has received recognition by the United States Government, or that of the Dominion of Canada.

3. That the claim that the Sanitary District is entitled, as a matter of right, to the use of so much of the waters of lake Michigan as may be necessary for sanitary and domestic purposes, cannot be entertained in so far as it relates to the extraordinary and wasteful use proposed.

4. It has been shown that very substantial injuries have been, and are being suffered by navigation interests. Fears for future and more extensive damages, by reason of increased diversion, are exceedingly well founded, and justify the demand that some improved method of sewage disposal, which shall not require the abstraction of any considerable quantity of water from lake Michigan nor the diversion of other outlets of waters which would naturally flow into it, be adopted.

5. That the Dominion of Canada has the right to a voice in the disposition of the waters of lake Michigan for sanitary purposes in so far as such diversion injuriously affects navigation, because her citizens are accorded, by treaty, the right of free navigation in that lake, and, in that no diversion can be made without injuriously affecting her harbours, channels and canals.

6. It having been shown that the sewage of Chicago can be so treated and disposed of by other means than the present dilution methods, by which great quantities of water are withdrawn from lake Michigan and discharged through the Drainage canal into the Illinois river, it is contended, on behalf of Canada, that the abstraction of water from lake Michigan shall be limited to such quantity as shall not injuriously affect navigation interests on the Canadian side of the boundary, and, that such limitations shall take effect at the end of such time, as, in your judgment, may be reasonably necessary for the Sanitary District to install, and put into use, the works which may be required for disposing of the sewage by other means than by the dilution method now in use.

7. That, in view of the fact that the Sanitary District claims that permits hitherto issued deal only with the flow through the lower portion of the Chicago river, and that it has the right to take any amount of water, without permission, through the canal, provided it is supplied through other feeders, it is respectfully requested that all permits be only for such limited quantity of water as shall not injuriously affect navigation on the lakes and St. Lawrence river, and be so worded as to state the total quantity which the Sanitary District of Chicago may be permitted to withdraw for domestic and sanitary purposes from the drainage basin of lake Michigan.

We feel confident that the interests of humanity at Chicago, as well as the levels of the Great lakes, and of the St. Lawrence river, can best be protected by the installation of a modern system of sewage disposal, rather than by using a method which has been shown to be injurious to the navigation and commerce of both nations, and further, that the interests of the public generally will, thus, be protected, and their welfare promoted.

Not access.
Gov.Doc. Canada. Marine and Fisheries, Dept.of
Can Papers relating to the application of the
M Sanitary District of Chicago for permission to
divert 10,000 cubic feet of water. 1912.

University of Toronto
Library

DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET

Acme Library Card Pocket
Under Pat. "Ref. Index File"
Made by LIBRARY BUREAU

3 1761 11469244 5